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High-Seas Welding in the Navy

Portable Outfits Permit Repair Jobs Wherever the Ships Are and Save Expensive and Time-Consuming Trips to Shore Stations

BY G. K. SPENCER*

DURING fleet maneuvers in the Pacific two United States destroyers came into glancing collision while emerging from a smoke screen. Boat davits and the end of a torpedo tube on one vessel were clipped off by the contact. Luckily the torpedo in the tube carried a practice head instead of a war head, or there might have been two destroyers less in the Navy.

Machinists' mates on the injured destroyer quickly swung inboard the remainder of the damaged davit and the injured torpedo tube. Later, the ship ran alongside the tender to the destroyer squadron, for emergency repairs. Within a few hours portable welders had completely repaired both the davit and the torpedo tube.

This was not an exceptional job. It was one of thousands performed every month aboard the ships of the fleet. The destroyers, being pressed for combat space, carry no portable welders, but every other ship in the fleet does. The larger vessels, such as battleships and train vessels, carry both electric and gas welding equipment.

Welding has now become one of the most important jobs done aboard ship by the Navy. Seldom does a battleship call upon a navy yard for welding work. Welding is occasionally done by navy yard workmen upon battleships, but only when the ship is in the yard having new construction placed on her. All other welding is performed by the ship's company. So significant is this work considered, that special instruction in electric and gas welding is given the mechanical personnel at regular periods on the *Pennsylvania, Idaho, Mississippi, West Virginia, Maryland, California, Tennessee, New Mexico, Arizona, Arkansas, New York, Texas, Utah, Nevada, Florida, Saratoga, Lexington* and all the major vessels of the train, numbering some 30 in all.

To supplement this class instruction, written articles are prepared and published in the principal journals read by enlisted personnel. So interesting have some of these naval welding articles proved that numerous requests have been received by the publishers and the Navy for copies of them for civilian shops.

Many of the heaviest welding jobs done in this country are done by the Navy. For instance, the welding of shanks to certain types of anchors involves bringing together pieces of metal as thick as

Welded Duralumin Tanks at the Naval Aircraft Factory in Philadelphia

(Top of page) Working on the bottom of a destroyer which has been raised from the water on a floating drydock at the San Diego base. A portable welder is employed in this work

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10 x 10 in. and larger. For a shipboard welding job, this is rather heavy.

And the mercantile marine, observing the success of the naval shipboard welding work, has now begun to carry portable welding equipment, and much good work is reported as a result. Ships' companies can be trained to this work, and considerable money saved by avoiding the cost of docking for the purpose.

Welding Below Water Level

The size and importance of jobs which can be undertaken with the Navy's portable welding apparatus are constantly increasing. Several months ago it became necessary to repair the blades of a propeller on a destroyer. It would have cost some $50,000 for the Navy to tow the ship from Culebra Island (West Indian group) to the nearest dock at Panama, and another $20,000 to dock her and repair her at the yard there.

With a portable cofferdam thrown around the injured propeller and the water pumped out, the ship's own mechanical personnel went down into the cofferdam, removed the propeller and brought it to the main deck. Here, with a portable welder from the *Altair*, tender to the twelfth destroyer division, the complete repair was made.

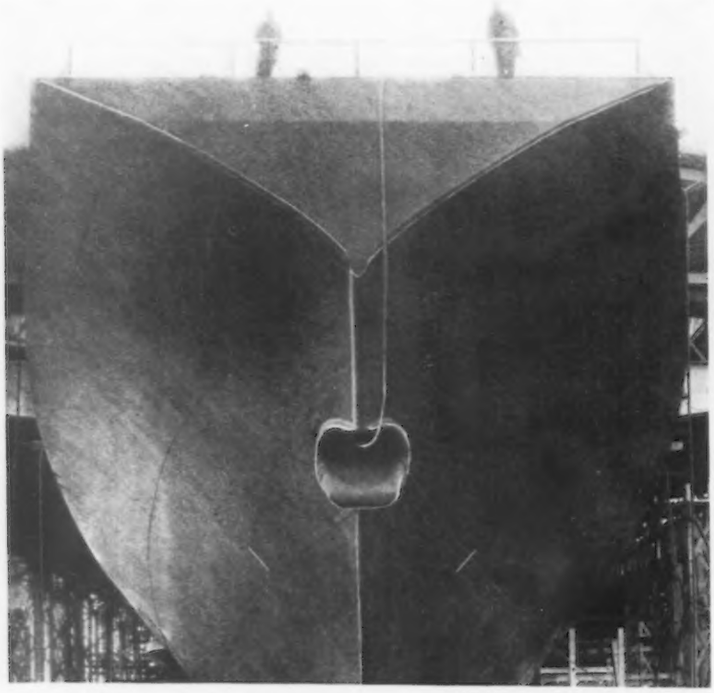
It is especially to be noted that in performing a great the Navy for portable welding equipment quickly translates itself into savings of hundreds of thousands of dollars within a short period. It is still somewhat less than 18 months that this widespread use of portable equipment has been in practice, but the saving alone in that time has been in excess of $300,000. The cost of all the equipment used was under $60,000, and it is still as good as new. This would represent a great saving in any industry.

It is especially to be noted that in performing a great part of its welding at sea, the Navy does not in reality take any significant business away from the civil industry, for the navy yards are maintained at a constant employed rate, anyhow. On the other hand, naval purchases in welding equipment for use at sea have been a real boon to the industry in several ways, not the least of which has been the investment in new equipment.

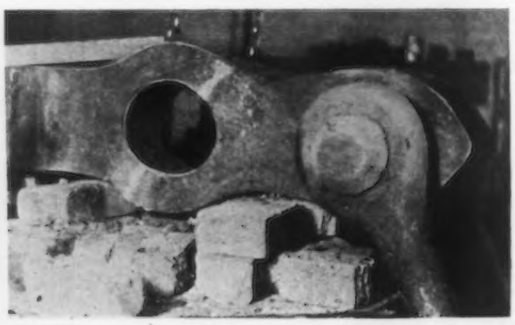
Savings created by the use of portable equipment at sea are mostly in the towage and incidental expense which can be eliminated. Thus, a breakdown some distance from a yard causes long towage at a heavy expense, even though naval vessels perform the towing. A portable welder on the spot avoids such expense.

At the San Diego naval destroyer base, both gas and electric welders of the portable type are in use, with the preference going to the electric welders, which are stationed at the marine railroads of the base for exterior valve work and direct work on the bottoms. Use of these welders has created a saving in the marine docks alone of more than $300,000 in three years. They could not be dispensed with without resultant heavy expense and loss to the Government.

A welder crew has been organized to do nothing but welding, to learn welding and specialize in it until the men become so expert in joining metals that any work they do may be depended upon completely to endure the shocks of sea duty. The first inspection made on the bottoms of destroyers coming into dock is that for the decision regarding any necessary welding.



Welded Job on a Heavy Navy Anchor (Below)



Welded Construction on the United States Aircraft Carrier Saratoga (Left). The illustration shows the unusual shape of the bow with its hawse pipe, which projects far beyond the cutwater. Welding was used on longitudinal seams and on the joints between the squared-off triangular section above the flare of the ship's side

The same type of portable equipment is used at the marine railroads in the Hawaiian naval district, where the service on destroyers, fast mine-layers and district vessels is similar to that at San Diego. This equipment is in daily use, and practically every ship coming into the docks needs some kind of welding work done. Welding junctures are always made in cases of installation or repairs to the condenser intakes, the exterior fittings which protrude at the ships' bottoms being riveted and then welded, to insure watertight integrity.

The welded job has come into higher favor daily. Practically all naval aircraft fuselages today are welded tubing, and the desire for the welded construction by the naval service is now practically universal.

Union wages show an increase of 260 per cent over the hourly rates of 1913, according to figures developed by the United States of Labor Statistics. They cover 862,308 trade-union members employed at time rates in 66 leading cities. Because of a decrease of 7.6 per cent in hours of work a week, the increase in weekly income was only 229 per cent.

Blast Furnace Gas Indicates Conditions

Tells Operator Much About How Fast Sulphur Is Being Removed and Whether Iron Is Fluid

BY WALLACE G. IMHOFF*

[*In the first instalment of this article it was pointed out that the color of the smoke and of the burning gases rising from the open-top blast furnaces indicates the character of the metal. For example, heavy, white smoke and burning flames of bright yellow are given off when a hot, limey furnace is making low-sulphur foundry iron. A particular cast (at 2 p. m.) was cited as a typical illustration of ideal conditions of lime combining with sulphur to form calcium sulphide.—Editor.*]

RESULTS of the conditions present at this time (2 p. m.) are reflected in the iron and slag analyses. In percentages these are:

Iron				Slag	
Silicon	Sulphur	Phos.	Mang.		
3.00	0.016	...	...	Silica	29.06
2.95	0.014	...	...	Alumina	14.52
2.55	0.038	0.58	0.72	Bases	51.42
2.97	0.029	...	...	Sulphur	2.60
3.03	0.027	...	...		

The 2 p. m. cast, with an analysis of 2.95 per cent silicon and 0.014 per cent sulphur, illustrates furnace conditions in which practically all of the sulphur going into the furnace is in the combined state in the form of CaS. This is shown by the low sulphur in the iron and the high sulphur in the slag.

When the iron was cast it was extremely hot. There was a large amount of graphite present and the iron had a tendency to be thick and mushy. A noticeable feature was the extreme heat of the iron. It also had a purple glow, due to the presence of manganese.

Since the kind of iron made is governed entirely by the slag characteristics, a moment will be devoted to a description of the slag. The first flush of cinder was very hot, with extremely heavy white clouds of fog, or smoke, rising from the slag runner. The cold slag samples had a tinge of greenish white on top. The second flush of cinder before casting was practically the same as the first. It was perhaps a little hotter, and heavy, dense white clouds of smoke rose from the slag runner. The third and last flush of cinder before casting was dazzling hot. Dense clouds of white smoke rose from the slag runner. The cold slag sample was between a hard, stony cinder and a grainy slag. It was greenish white on top, the green color being due to manganese.

Reactions Inside the Furnace

Details of the conditions which produce a heavy yellow flame accompanied by dense white smoke having been described, it now remains to explain the chemical and metallurgical reactions going on inside the furnace. The large amount of sulphur going into the furnace, derived from the coke and the pyrites cinder, requires a large amount of lime to combine with it and remove it in the form of calcium sulphide. The heavy lime calls for the great amount of heat referred to, since as a slag becomes more basic in character a greater amount of heat is required to melt it and keep it fluid.

But the higher the hearth temperature, the more the reduction of silica from the slag to silicon, which goes into the iron. The silica gives fluidity to the slag; therefore, as the amount of silica in the slag is reduced, the slag either becomes thick and viscous, if it remains at the same temperature, or must be raised to a higher temperature, to be kept thin and fluid. Since the lime is not changed, its proportion automatically increases as the silica is reduced and goes into the iron. This, therefore, also has a tendency to raise the melting point of the slag, if it is to be kept in a fluid state. On a hot hearth there is thus the tendency to decrease the silica in the slag, which automatically increases the lime ratio.

Conditions for Removing Sulphur

Turning our attention for a moment to the sulphur present, we find that the ideal conditions to promote the formation of CaS are with a hot hearth, when the bonds of lime and silica are weakened and the silica is being reduced to silicon. The lime actively takes hold on the sulphur. A large amount of it is required to remove the sulphur. The slag body itself is made up of a highly complex lime-aluminum-silicate and the CaS is dissolved in this liquid body much the same as sugar is dissolved in water.

At the high temperature, however, the slag becomes supersaturated under the conditions of pressure and temperature inside the furnace. When the slag comes out into the air, and the conditions of temperature and pressure are radically changed, the slag being supersaturated, there is a tendency then for the CaS in solution to be thrown off as a heavy white fog, or smoke rising from the slag runner. The high degree of saturation of the slag with CaS is shown by the sulphur content in the slag, which is 2.60 per cent.

High silicon in the iron tends to promote the formation of graphitic carbon, often called "kish." Carbon imparts fluidity to the iron. Therefore, as the silicon increases in the iron there is a tendency to promote the formation of graphitic carbon, which, by removing carbon from the iron, reduces its fluidity and makes it thick and mushy.

When the iron is thick and mushy and without fluidity it will not absorb manganese. Therefore, even though the furnace is very hot, a large part of the managanese goes into the slag and imparts the yellow or olive green color to it. The formation of graphitic carbon has a tendency to open the grain of the iron and make it soft. This accounts for the open grain and softness of high-silicon, low-sulphur, foundry irons.

What Can Be Learned from the Gas

Turning our attention to the gas produced under these conditions, we note that we get some factors directly, and others we get indirectly. For example, the fact that the gas burns with a heavy, bright yellow flame shows the

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presence of a large amount of extremely finely divided carbon particles. This factor is proved indirectly by the large amount of excess carbon, in the form of graphite, floating about in the cast house air. By observation, also, the great quantity of gas is noted, showing that the conditions are such as to liberate large quantities of carbon for burning purposes.

There is a tendency for the molten iron to throw off carbon rather than to absorb it. This fact is shown in the thick, mushy state of the iron. Carbon gives fluidity to the iron and so much has been removed from it, in the form of graphite, that the iron is thick and pasty. The sulphur in the iron is low (0.014 per cent) while the sulphur in the slag is high (2.60 per cent). This fact shows that the gas contains very little sulphur, if any.

An important condition to take note of, from the standpoint of production, is the fact that the removal of too much carbon from the iron in the form of graphite has the tendency to build up the hearth and hold the iron in the furnace. This accounts for a large cast of iron when the iron again becomes more fluid. It simply dissolves up this accumulation of dry iron in the hearth. From the standpoint of production, vitally important commercially, it is not profitable to keep the furnace in this condition for any great length of time. Under these conditions production is low, and the furnace will eventually stick and slip violently, causing considerable trouble. The ultimate end is high lime, a cold hearth, "off iron" and low production.

This must not, however, be confused with conditions which give high production. The distinction is to be found in the fluidity of the iron and the slag. High production is obtained with the fusion zone in the hearth, a high hearth temperature, and enough carbon in the iron to keep it thin and fluid. Under these conditions the furnace will drive well, the gas will be in large volume, and enough carbon will be free to supply a large amount of heat to the gas. The gas will burn with a heavy, yellow flame.

Examples with heavy, hot yellow gas and good production are shown by the following analyses, in percentages:

Iron						Slag	
Silicon	1.00	0.99	1.00	1.39	1.68	Silica	33.14
Sulphur	0.025	0.023	0.023	0.021	0.027	Alumina	12.64
Phos.	...	...	0.232	...	...	Lime	44.20
Mang.	...	...	1.11	...	...	Magnesia	7.23
						Iron	0.49
						Sulphur	2.12
Silicon	1.12	0.86	0.83	0.90	0.78	Silica	31.70
Sulphur	0.031	0.045	0.034	0.030	0.023	Alumina	12.66
Phos.	...	...	0.241	...	...	Lime	45.10
Mang.	...	...	1.06	...	...	Magnesia	7.32
						Iron	0.26
						Sulphur	2.17

The fusion zone in both these examples was down in the hearth.

For high production and good, regular driving, the ideal condition is to have the fusion zone down in the hearth. This condition gives a strong, yellow gas carrying a high heating value. As the hearth becomes cold, reactions set in which tend to change the character and heating value of the gas. Gradually the volume of free sulphur increases, the amount of silica reduced decreases, the carbon has a tendency to be absorbed by the iron as combined carbon, the volume of gas produced diminishes, and the heating value becomes low. The change in color of the gas is first shown by the fact that the heavy, bright yellow gas gradually turns to orange, then to a deep blue, and finally it becomes a crimson red to violet. The volume of gas becomes much smaller, making it necessary to use coal at the boilers to keep up steam. There is also little heating value in the small volume of gas that is made.

Conditions Experienced in Practice

A few examples will show this gradual change taking place under practical conditions. The following example illustrates the start. The gas at the boilers had slowly changed from the heavy, yellow gas to medium, light purple, carrying only a moderate heating value. The top flame was three-quarters blue and one-quarter red. The slag was limey and there was an exceedingly strong, choking smell of free sulphur rising from the slag runner. The furnace drove slowly. The top heat was 780 deg. Fahr. The bottom and hearth were cold.

The analyses show the decrease in silicon in the iron, with the corresponding increase in silica in the slag; and the drop in sulphur in the slag from 2.17 to 1.74 per cent, with the strong smell of free sulphur. The sulphur in the iron has risen from an average of 0.025 to an average of about 0.034 per cent and the gas has changed from yellow to mostly blue. The carbon, which formerly was free to burn, is now absorbed by the iron. Since carbon is the chemical element which imparts fluidity to iron, its removal in the form of graphite thickens the iron and makes it mushy. Vice versa, an increase in combined carbon makes the iron thin and fluid. The analyses of the iron and slag under conditions which furnish medium blue gas are below:

Iron						Slag	
Silicon	0.80	0.73	0.73	0.79	0.85	Silica	34.06
Sulphur	0.036	0.035	0.033	0.031	0.031	Alumina	11.76
						Lime	45.10
						Magnesia	6.73
						Iron	0.45
						Sulphur	1.74

Comparing these analyses with the previous ones for hot, yellow gas, we observe the lime is the same at 45.10 per cent. But the furnace is colder. This is shown by the rise in silica in the slag from 31.70 to 34.06 per cent and the fall of sulphur from 2.17 to 1.74 per cent. The fall of sulphur, and the high top heat, 780 deg. Fahr., show that the fusion zone is now no longer down in the hearth, but up in the middle of the furnace. The iron, which is the principal temperature indicator, has risen from 0.26 to 0.45 per cent, showing the hearth to be much colder. The slag indicates the hearth temperature.

(To be concluded)

How to Use Current Business Statistics

Almost all important business organizations now make use of statistical information for guidance of their respective activities, it is pointed out by Mortimer B. Lane of the Bureau of Census, in commenting on a study "How to Use Current Business Statistics," recently issued. Copies may be obtained at 15c. from the Government Printing Office, Washington. The meaning of the various statistical terms is explained, with examples of their interpretation, taken from the experience of business firms.

Practical application of current statistical information by American business has been, Mr. Lane said, one of the outstanding factors in the generally sustained prosperity of the country during the past five years. Previous periods of similar commercial and industrial activity have as a rule been characterized by more or less violent fluctuations. Nearly 300 instances of the use of statistics in business have been collected by Mr. Lane, who presents suggestions as to how the data may be used to the best advantage. The small business man has been particularly benefited by securing, through the use of current statistics, information he could not hope to obtain without collective action.

The rise of statistics from small beginnings to a position of such commanding importance, it was pointed out, has been a definite response to the growing needs of business. The business executive of today cannot have, either in his mind or in the possession of his own concern, all the facts necessary for intelligent business judgment. He must not only know how his firm is doing, but must compare his branch of industry with industry as a whole, and must know the buying conditions of his customers as well as the condition of his material markets.

Cost of Producing Electric Power

Consideration of Elements, Some of Which Vary with Amount of Current Used While Others Are Constant

BY W. B. SKINKLE*

EVIDENTLY the total cost of any product is represented by the sum of the fixed charges plus the operating costs. Fixed charges are constant and independent of amount of production. Operating costs are variable and largely dependent upon the output. There is, however, a large part of operating costs which is constant, regardless of the output. In addition there is the increment cost, which is directly proportional to the output.

Segregation of that part of the operating cost which is constant and determination of the increment cost form the major object of the paper. Careful consideration of many items, appearing at first thought to be variable in direct proportion to the load, fails to disclose a single item which does not have some constant element independent of the load. The cost of fuel is almost directly proportional to the load. There are, however, certain items, such as radiation losses, unburned fuel, etc., which will be constant, regardless of the load. This item, therefore, may be charged as 90 per cent variable and 10 per cent constant.

Working Out Costs for Hypothetical Plant

General practice indicates that steel works boilers operate at an average annual rate of about 133 per cent of rating. Consequently, in a hypothetical boiler house of 15,000 boiler hp. installed capacity, the output would average about 20,000 boiler hp. Estimates of the cost of a modern boiler house indicate that $123 for each horsepower of rated capacity would be a fair price on which to base fixed charges. This shows an investment of $1,850,000. Fixed charges at 13 per cent represent $240,000 a year or $20,000 a month. This 13 per cent is 6 per cent interest on investment, 5 per cent depreciation and 2 per cent insurance and taxes.

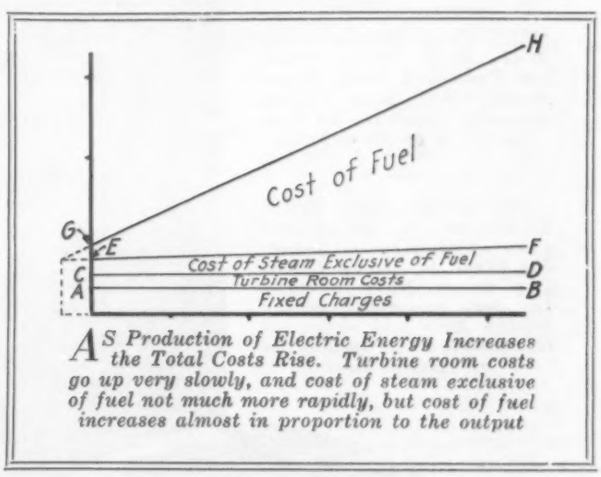
Constant cost of steam exclusive of fuel has been worked out at a total of 93.4c. per boiler hp.-month. As the production of steam is 20,000 boiler hp.-months each month, the constant cost chargeable against it is $18,700 a month. This figure, which excludes fuel, is independent of the amount of steam actually produced.

Including the fuel, the constant operating costs, regardless of the actual amount of steam produced, figure out at $1.301 for each boiler hp.-month. This makes the constant cost of steam total $26,000, independently of the steam produced. Variable operating costs, proportional to the steam production, have been worked out at about $3.70 for each boiler hp.-month. If M is the amount of this steam, then the total month's operating cost for this boiler plant would be $20,000 fixed charges, plus $26,000 constant operating cost, plus $3.70 M, for the variable cost of steam used.

Evaluating Generating Costs on Same Basis

Cost of producing electric energy is developed along lines similar to those followed in arriving at the cost of steam. Estimates on a modern 15,000-kw. turbo-generator station complete show a total first cost of $1,480,000. Fixed charges at 13 per cent represent $192,000 a year, or $16,000 a month. Detailed calculations for the constant cost of electric energy, exclusive of steam or fuel costs, show 65.2c. for each 1000 kwhr. This cost is based on an average load factor of 48 per cent and an average of 730 hr. operation each month. This results in production of 5,250,000 kwhr. a month and represents a constant turbine-room cost of $3,425 a month. This is independent of the amount of electric energy produced. Similar calculations show that the variable cost of electricity exclusive of steam is 5.1c. for each 1000 kwhr.

Adding the cost of steam, exclusive of fuel, to the 65.2c. above reported, the total constant cost of electricity exclusive of fuel is $1.345 for each 1000 kwhr., or a total monthly charge of $7,060. This is a constant expense, independent of the quantity of electric energy produced.



AS Production of Electric Energy Increases the Total Costs Rise. Turbine room costs go up very slowly, and cost of steam exclusive of fuel not much more rapidly, but cost of fuel increases almost in proportion to the output

Similarly, the variable operating cost exclusive of fuel works out to 34.8c. for each 1000 kwhr. Hence, the total cost, exclusive of fuel, for the electric plant represents $16,000 fixed charges, plus $7,060 constant operating cost, plus $0.348 E variable cost, where E equals the number of thousands of kwhr. produced.

Representation of these various factors on the diagram shows the fixed charges as the line AB above the base line. Turbine-room costs are represented by the space between AB and CD and the cost of steam, exclusive of fuel, is the space between CD and EF. The fixed charges are uniform, regardless of power production. The other two items below EF show a slight upward tendency, although the greater portion of the cost is independent of the amount of power produced. Adding the cost of fuel, however, in the line GH, produces a sharp upward slope, for the fuel depends to the extent of about 90 per cent on the amount of power sent. out.

[In the paper as presented these matters were all brought out in considerable detail, with the aid of numerous graphs to illustrate the points made.]

*Engineer Pittsburgh district power committee, subsidiary companies of United States Steel Corporation. This is an abstract of a paper presented before the Chicago convention of the Association of Iron and Steel Electrical Engineers.

Materials-Handling Problems Ably Met

BY C. A. McGRODER

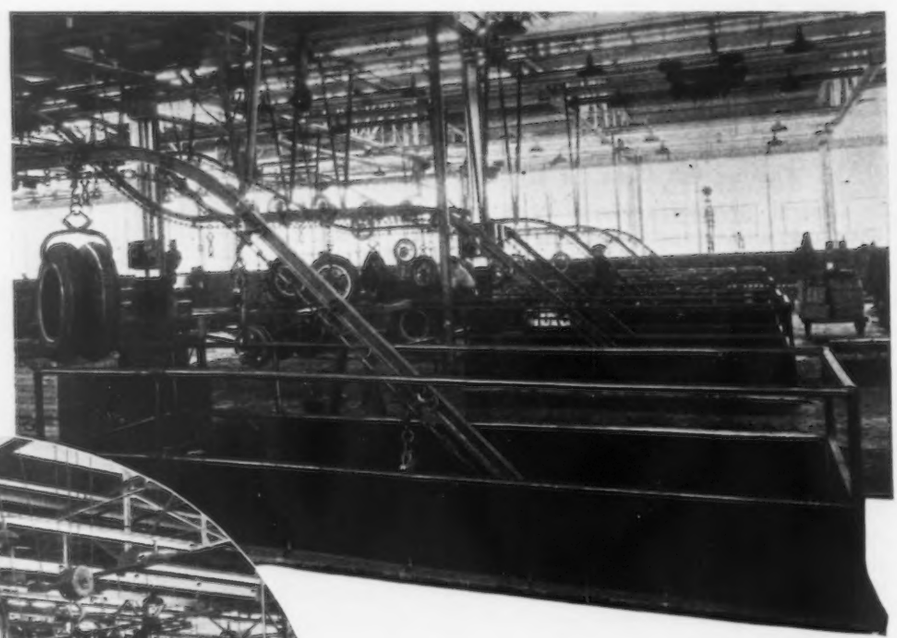
FAITH in the future of commercial motor transportation inspired the General Motors Truck Corporation to build at Pontiac, Mich., within the last 12 months, what is claimed to be the largest plant in the world devoted exclusively to the manufacture of commercial vehicles. Early in July, 1927, just before ground was broken for the foundations, a crop of hay was taken off the 156-acre farm on which the plant is located. On Jan. 3, 1928, finished vehicles were coming off the production line. More than 750,000 cu. ft. of earth had been excavated from the hilly ground of the farm. Approximately 9000 tons of structural steel, 80,000 cu. yd. of concrete, 4,500,000 bd. ft. of lumber, 93 miles of iron and steel pipe and 500,000 sq. ft. of glass had been brought in to establish new records for speed and size in industrial construction.

1500-Ft. Receiving Platform for Motor Truck Freight

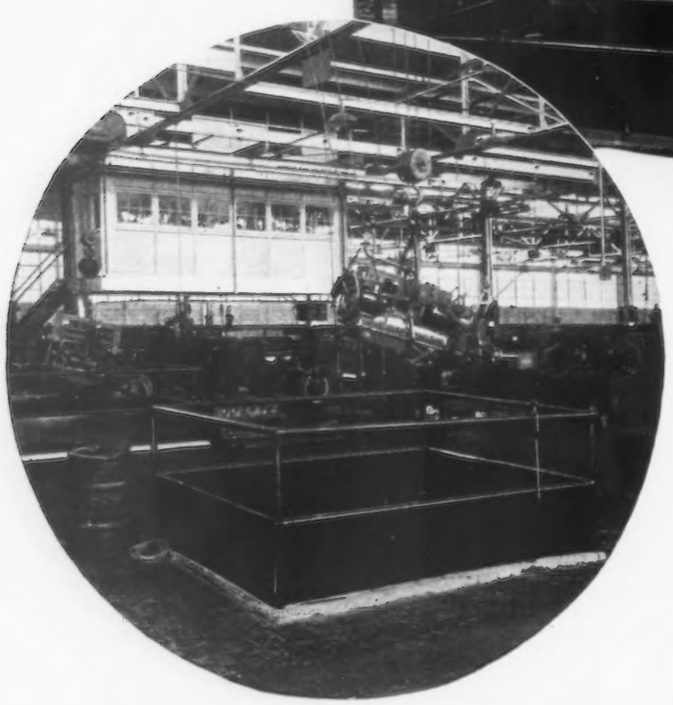
The same faith in the future of motor truck transportation that built the world's largest truck plant is evidenced in the facilities provided at the new plant for the delivery of materials and parts by motor truck. Running down one side of the main building for a distance of 1500 ft. is a receiving platform for incoming truck freight, exclusively. On the other side of this building, which is 240 ft. wide, is a similar platform of equal length, for receiving rail shipments. Such ample provision for rail freight is not unusual, but the setting aside of an equal amount of space for truck delivery of materials is something of an innovation.

Materials handling became a major problem in planning the layout of the new plant when it was decided that at least four distinct assembly lines would be required for the complete General Motors commercial line, embracing motor trucks, taxicabs and motor coaches in a diversity of sizes, models and tonnage. If these assembly lines had been located on the main floor of the building between the truck receiving dock and the rail receiving dock, great difficulties would have been encountered in moving materials to the two central assembly lines. Overhead conveyors would have been required to lift materials over the outside lines and drop them near the central lines. Delay and confusion on the outside lines would have been the unavoidable result.

THE Chain Escalators, at the Right, Bring Wheels and Tires and Other Minor Assemblies Up to the Chassis Assembly Line on the Second Floor of Main Plant



One of the Many Railed Hatchways on the Second Floor of the Chassis Assembly Plant Is Shown Below. The power plant pictured has been assembled on the ground floor and comes up to chassis assembly line on an electric hoist



Two-Floor Arrangement of Chassis Assembly Plant Minimizes Cost

The difficulties were obviated and the cost of handling the materials was minimized by locating the chassis assembly plant on the second floor of the main building. This second floor terminates at the rear of the building in a hillside, where the heavy chassis frames are unloaded from freight cars on a railroad siding which is on a level with the second floor of the plant. Loaded upon storage and transfer cars, the frames are taken into the second floor to the beginning of the assembly lines. This leaves the entire ground

in Truck Plant

floor below the assembly lines available for the receiving, storing and sub-assembling of all the principal units and parts of the chassis except the frame.

Frames for the smaller units, such as light trucks and taxicabs, arrive at the plant completely assembled and ready for the chassis assembly lines. Larger frames, for 2-ton and larger trucks and for coaches, on which standardization of frame length is impossible because of the great variation in wheelbase length, are delivered unassembled. Space is provided between the freight car siding and the beginning of the chassis assembly lines on the second floor where the frame members are riveted together before being placed on the lines. As there are always some chassis parts, such as frame brackets, which require machining, space for these operations is provided near the beginning of the assembly lines. The parts are brought up from the floor below on escalators and deposited near a battery of standard machines at this point.

THE Receiving Dock For Truck Freight, Shown at the Left, Is 1500 Ft. Long. Many of the parts used in building General Motors trucks, coaches and taxicabs are shipped by truck from other plants in Pontiac, other Michigan cities, from Cleveland, Detroit and Chicago

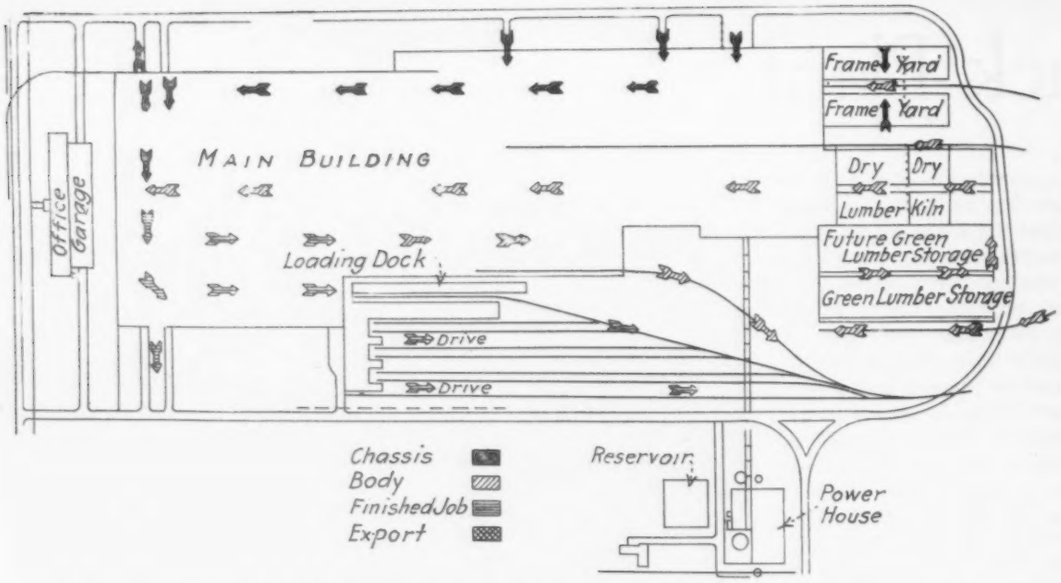
All Rail Shipments Except Chassis Frames Are Unloaded From the Railroad Receiving Dock Shown in the Insert Above

After the necessary fixtures and brackets are attached to the frames, which start their journey along the assembly lines bottom side up, axle and spring assemblies are brought up from the ground floor by electric hoists, through open, railed hatchways, and dropped into position on the frames by the same hoists. Continuous chain conveyors bring up wheel and tire assemblies and other parts that are to be attached to the lower side of the frame. This accomplished, the partially completed chassis is turned over on the assembly line and proceeds on its own wheels to subsequent assembling operations.

Materials and Parts Fed Into Assembly Lines from Sides of Building

Here can be noted the most economical feature of materials handling made possible by the two-floor construction of the chassis assembly plant. There is little or no movement of parts and materials on either floor in a direction parallel to the assembly lines. All the materials handling is across the width of the building, from the receiving platforms toward the center of the building and up through the hatchways to the assembly lines on the second floor. This economy is effected by landing incoming materials at points on the receiving docks almost directly under the place where they will be required on the second-floor assembly lines. Each bay on the receiving docks is numbered. A motor truck arriving with a load of wheels or tires is assigned to a section of the truck receiving dock near the rear of the plant and almost directly under the hatchway nearest to the point on the assembly line above where wheels and tires are attached to the chassis frame, just before it is turned right side up to proceed on its own wheels.

An incoming freight car loaded with truck engines is spotted on the siding at the rail receiving dock at a point nearer to the front of the building where the power plants are assembled on the ground floor and sent up to the second floor through the hatchway nearest the point on the assembly lines where the power plants are put in place on the chassis. In the case of engines and other heavy parts the same electric hoists that bring them to the upper floor drop them into position on the slowly moving chassis in one handling operation. Sub-assembly lines on the first floor move across the width of the building toward the center, ending under the second floor assembly lines. Motor and transmission assembly, including electrical units, is accomplished on roller type conveyors, one for each type of power plant, each ending under the hatchway through



FLOW Plan of New General Motors Truck Plant. The routes of chassis and body assembly lines, which merge near the front of the plant and flow together toward shipping platform and storage space, are shown

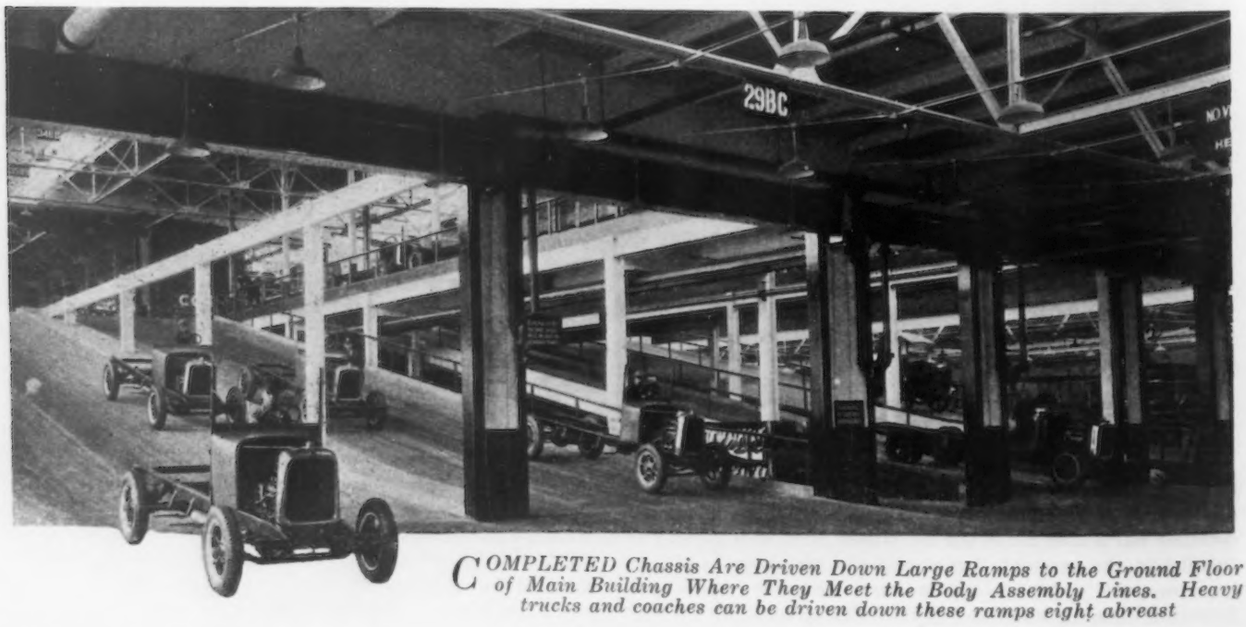
which its engines pass to the floor above. Cowls and instrument boards are another separate sub-assembly line on the ground floor, ending under the point on the second floor where they are put in position on the moving chassis.

By the time the chassis reaches the end of the assembly conveyor line, near the front of the plant, all of the primary assembly operations have been completed and the unit is ready for dynamometer testing. Oil and gasoline have been provided through pipe lines which terminate over the ends of the assembly lines. The units are driven to the dynamometers on their own power. An unusually large battery of dynamometers, 20 in all, extends the full width of the second floor of the main building. They are provided with quickly adjustable jacks to meet the variations in wheelbase lengths. Each unit is subjected to a 90-min. test in all speeds and up to full throttle operation. Rollers under the rear wheels of the vehicle being tested absorb torque and operate electric generators mounted under the floor. There are mileage and speed recording speedometers as well as fuel metering tanks for fuel economy tests.

Second Series of Conveyors for Chassis Painting and Final Assembling

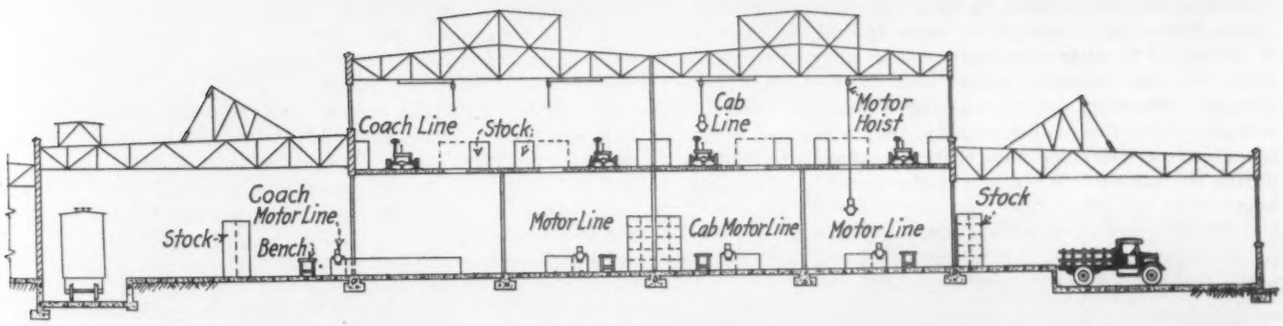
After testing, the vehicles are driven down long ramps that terminate on the first floor, where the units are attached to a second series of conveyors for the chassis painting and final assembly. Here the chassis are cleaned by a gasoline spray and lacquered as they pass through spray booths. At this point on the final assembly lines enamelware, such as running boards, fenders, hoods, etc., are added to the chassis, brought from the huge storage rooms located under the ramps. After these operations are completed the vehicles are driven from the ends of the secondary assembly lines into a transverse section of the plant which runs at right angles to the chassis assembly conveyors. Here the bodies, brought from the adjoining body department by overhead electric cranes, are mounted on the chassis. The vehicles then make another right angle turn toward the rear of the plant, into the shipping warehouse. Across the rear end of this warehouse is a loading dock, 60 ft. long, which lies between the warehouse and the ends of the loading tracks. Vehicles can be loaded from this platform either into end-door or side-door box cars or they may be run down between the loading tracks and loaded into the cars, circus fashion, by use of skids.

Vehicles that are to be exported pass directly from the warehouse to the export loading dock, where they are disassembled and boxed. Export boxes are made in this department, the lumber being brought in on transfer cars from a lumber storage yard just outside. Completely boxed



COMPLETED Chassis Are Driven Down Large Ramps to the Ground Floor of Main Building Where They Meet the Body Assembly Lines. Heavy trucks and coaches can be driven down these ramps eight abreast

LARGEST Of the Four Chassis Assembly Lines Is That on Which the Yellow Coach, Gas-Electric Chassis Are Assembled. The view at right is of the end of the line where the last operations on the chassis are completed before the vehicle is driven down the ramps to the ground floor



FRONT elevation of the New General Motors Truck Plant at Pontiac, Mich., Showing Second Floor Chassis Assembly Lines and Facilities for Receiving Both Truck and Rail Freight. Materials and parts are moved toward the center of the plant by a network of overhead chain and electric hoists running on monorails. After sub-assembly operations are completed, the parts are lifted to chassis assembly lines through hatchways by electric hoists

—

View of Light Truck Assembly Line on Second Floor of Main Building. The vehicles proceed on their own wheels, drawn by chain conveyor

vehicles are picked up by a traveling crane and placed upon flat cars which are run into the building on an inclosed siding.

Wood Refuse from Body Plant Conveyed to Boiler Room

The initial department of the body plant is a battery of kilns which lies between the green lumber storage and the dry lumber storage. Material from the dry lumber storage is delivered to the wood mill by traveling cranes which distribute the lumber to the stock saws. Wood refuse from the wood mill is transferred, by means of an exhaust system which is connected with all woodworking machines, to the power plant where it is burned in a special boiler which is adapted to the burning of pulverized coal or sawdust. Refuse from the wood mill, other than chips and sawdust, is collected from the machines and ground into chips by a "hog," from which the chips are drawn into the exhaust system and conveyed to the boiler room.

Adjoining the body frame department is the sheet metal department, located in the same crane bay which serves for handling export shipments at the other end of the building. Sheet steel is received in gondolas in 10-ton bales which are removed from the cars by the crane and stored near the sheet steel presses. From the crane bay the sheets progress through the sheet metal department toward the body assembly lines, undergoing various machine treatments. Truck, coach and taxicab bodies are manufactured here. Each type of body is handled upon one of four conveyor chains which move the bodies through their various assembling operations.

After being completely assembled the bodies move from the body assembly conveyors into the lacquer booths. Parallel to the lacquer rooms is a series of drying ovens for accelerating the drying of priming coats. The last operations upon the body take place under a crane bay, which makes it possible to mount the heavier body types with the help of the electric crane. The completed vehicle is now ready to be driven out of the plant.

Quenching in Hot Salt Baths Recommended

PROFESSOR K. HONDA and one of his associates, K. Tamaru, have heated a Swedish steel (0.89 per cent carbon) 15 min. at 800 deg. C., then quenched it in mercury or salt baths at various elevated temperatures, and investigated the resulting properties. It is well known that drastic water quenching (to be followed by a draw) is liable to cause cracks either large enough to cause instant rejection, or if undetected to cause rapid failure under alternating stress. Since the experimenters believe that austenite must pass through martensite before reaching a pearlitic condition, irrespective of the cooling velocity, they attempted to discover such a quenching rate that the expansion occurring during the austenite to martensite change would be counterbalanced by the contraction occurring in further decomposition of the martensite, taking place simultaneously in adjacent regions. Results are given in *Science Reports*, Imperial Tohoku University, January, 1928.

BRINELL HARDNESS NUMBERS OF QUENCHED STEEL

Temperature of Bath or Draw. Deg. C.	Time in Hot Quenching Bath			Water Quenched and Tempered
	1 Min.	10 Min.	20 Min.	
100	664	664	640	685
200	589	628	615	600
250	582	583	484	540
300	507	501	435	505
350	400	430	385	480
400	375	395	370	410
500	364	370	350	325
550	358	360	...	290

Mercury was used for quenching temperatures up to 150 deg. C.; above that, a eutectic mixture (65:35) of potassium and lithium nitrates. Hardness tests are summarized in the table. It will be noted that, if the quenched steel is allowed to remain in the hot quenching bath a considerable time (20 min.), the hardness is somewhat reduced because the martensite has more opportunity to decompose further into the soft sorbite and even pearlite.

The table shows that the decomposition temperature of martensite also falls with increased time in the hot bath, as follows:

Water quenched	270 deg. C.
One minute in hot bath	280 deg. C.
Ten minutes in hot bath	250 deg. C.
Twenty minutes in hot bath	230 deg. C.

A second elbow in the curve for water quenched steels, at about 430 deg. C., represents the hardening effect of recrystallization on reheating.

Cracking always takes place if the temperature of the quenching bath is below 120 deg. C., for then the surface layers contain more arrested austenite than the core and consequently are under tension. When the quenching bath is from 150 to 200 deg. C., no arrested austenite is found near the surface and the inner portion is martensitic and contains only a very small amount of troostite; hence the shell is under compression. Although the specimen is very hard it seldom cracks. Such conditions are ideal for the preparation of sound steel parts.

Variations in tensile strength and impact resistance are also explained on the basis of observed microstructure. Sorbitic structures can be obtained by quenching in melted salt at about 500 deg. C., and give physical properties "not inferior to those after water quenching and tempering." Furthermore this is thought by the authors to be a simpler method of heat treatment and one which avoids the danger of quenching cracks.

Curious Use of Pig Iron

In the days of sailing vessels much pig iron was used as ballast. The British Navy, in particular, had definite specifications for iron to be used for this purpose. Its contract called for iron which was to be "good, sound merchantable and not to break." Two sizes were specified, measuring respectively 6 in. square and 3 ft. long and 4½ x 6 in. in section and 18 in. long. It was stipulated that 5 cu. ft. of these pigs were to weigh 1 ton.

As sailing ships gradually went out of vogue (and out of commission) they landed their ballast at the dockyards, and the accumulation of pig iron from this source, reaching at one time nearly 40,000 tons, became a matter of embarrassment, according to the *Engineer* (London). Attempts to dispose of the material had little success, as the metal was found unsuitable for foundry purposes. It varied in characteristics, from pig to pig. In a period of 6 years only 1823 tons were sold, at a price averaging about 47s. ($11.50) a ton. Ultimately, much of the iron remaining in stock was used in making roads, which in time were found to show very little deterioration.

In apportioning freight cars for their work the *American Railway Association* estimates that 454,760 cars will be loaded with iron and steel products in the third quarter of 1928. This is an increase of 4.8 per cent over the 433,823 carloads of the corresponding period in 1927.

Top-Fired Annealing Furnaces

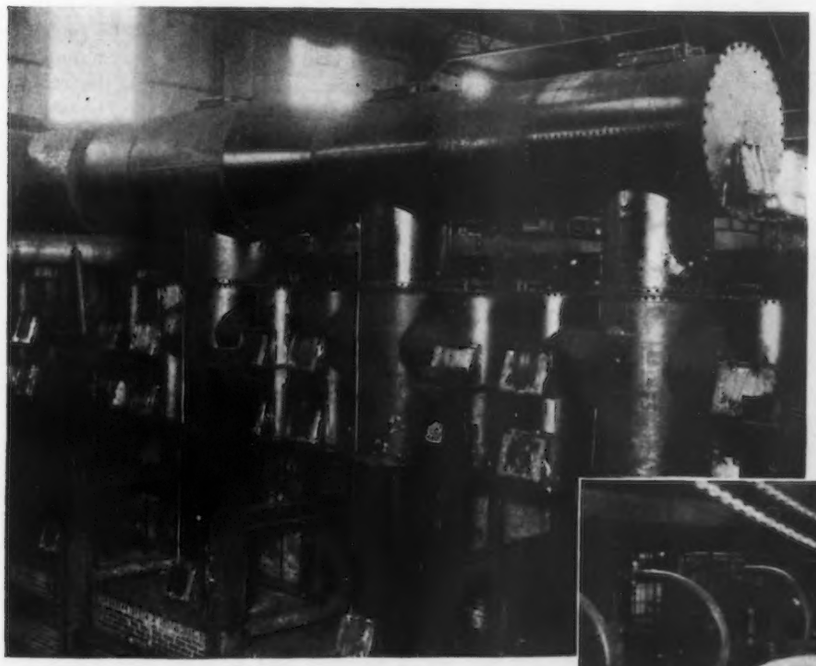
Arrangement for Controlling Gas Flow Through Manifold and for Providing Uniform Temperature—Control Located in Front of Furnace

BY OLIVER P. LUETSCHER*

UNUSUAL features in applying the fuel supply have been incorporated in annealing furnaces in the plant of the Acme Steel Co., Riverdale, Ill. This installation, under the design of the writer, consists of a set of furnaces used for annealing strip steel, both in nested coils and in flat, piled, cut lengths. The method of handling is the usual one for box annealing strips, sheets, tin plate and other similar products.

Raw producer gas from a mechanical producer is brought to the furnaces by steel plate flues lined with insulating brick. It is the method of applying the gas which is entirely new and was developed for this installation. Gas is brought from the main into a vertical leg in the center at the back of the furnace. From this leg gas passes into two valve casings, one at either side and at a level near the crown of the furnace. From the two valves the gas is led into two manifolds or headers along either side of the furnace and above the crown. The center lines of these manifolds are parallel to the side walls and slightly within the line of the inner surface of the walls. The arrangement, which may be seen clearly from the photographs, serves to settle out most of the soot or dust in the gas. This is removed periodically from the clean outdoors in the leg and casings.

From the two manifolds the gas passes into the furnace chamber through a series of ports. These are located below and in line with a series of cast iron saddles on the lower side of the manifold and resting on top of the furnace. The ports are lined with refractory burner blocks



AT Left Are Shown the Gas Connections Between the Main and the Furnace, Together With the Valve Casings Through Which Gas Passes from the Vertical Legs

AIR-CONTROL Mechanism Is Shown at Right as It Is Placed Above Each Furnace. The regulation valves serve to adjust the flow of air

*Mechanical and metallurgical engineer, Peru, Ill.

to maintain ignition and slow down the flame. Immediately above the ports and in line with them another series of saddles, resting on top of the manifolds, carries the air-regulating mechanism.

This consists essentially of a nozzle which combines the function of directing the air and regulating the proportional flow of gas to the port which it serves. Each nozzle is carried on the end of a long stem which projects beyond a stuffing box in the cover of the saddle. The stem has an enlarged portion which is grooved to engage a pair of pawls. This arrangement permits the nozzle to be set in any desired position to give the proper gas opening between the nozzle and the seat below it. At the top of

Front of One of the Group of Five Furnaces, Which Are Side by Side. Control chains hang before each door. Car bottoms roll in on balls in grooves

the stem is an air-regulation valve, which serves to adjust the flow of air to the nozzle in the desired amount.

A peep hole at this point permits the operator to view the flame from that particular port. There is also provision to allow the nozzle to be lowered on to its seat and to clean off any accumulated tar or soot by the rotation of cleaning vanes. Air is brought to the individual ports by manifolds located parallel to the gas manifolds. These are carried in brackets on the upper saddles and a flexible connection brings the air to each nozzle stem.

Direct operating control of the furnace is obtained by the two main gas valves at the back and by two corresponding air valves in the air manifolds. The air and gas control at each port are for adjustment of the separate ports. The operating control is brought to the front of the furnace, where it is actuated by hand chains. This is arranged so that the operator can regulate the furnace while viewing the flame through the peep holes in the door.

It will be evident from the above that the flame enters the furnace through the roof and is projected vertically downward. Furthermore, the flame from each port can be made any desired proportion of the total. By this system the operators have found that any portion of the furnace—top, bottom, front, back or sides—can be controlled and the temperature of that particular section raised or lowered during the cycle.

Very little clogging has been encountered. On the few occasions when it has been a factor, it has been found that operation of the cleaner for a few seconds has cleared the ports. Adjustment of the individual nozzles is seldom changed, as in ordinary operation everything is managed from the floor in front of the furnace. One most desirable point is the possibility of securing smokeless operation under a slight pressure in the heating chamber, without excess air in the chamber. The closeness of control permits the operator to keep his temperature near the maximum without danger of overheating any portion of the charge. In consequence, this has reduced the time of the cycle from that required where such close control is not available.

From the mechanical standpoint the design offers the desirable feature of complete accessibility. There are no underground gas passages or small masonry ports to become clogged. All of these parts are on top of the furnace, where they can be inspected or repaired without difficulty. The entire nozzle mechanism is carried from the cover. It can be removed and a new one put in in less than 5 min. The port tiles are removable through the top of the manifold and, if necessary, can be replaced without cooling the furnace.

From the standpoint of the user, a matter of interest is the fact that the system can be applied to existing furnaces with little change. It is equally applicable to both intermittent and direct-fired tunnel kiln types of furnaces. It can be adapted also to other fuels, such as powdered coals or liquids, in combination with gas. These furnaces have been in operation about three months, but the initial experimental furnace was running for three months before that.

One Cause of Unemployment Difficult to Gage

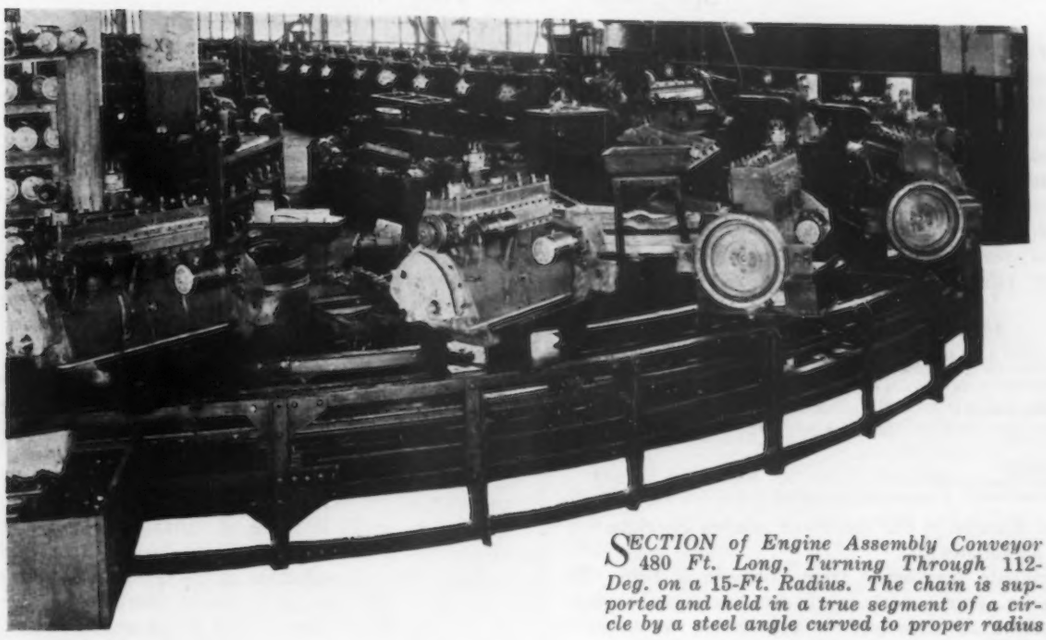
Displacement of labor resulting from technical improvements is tending to create a perpetual problem in many of our factory industries—a problem which can be relieved only by the gradual absorption of such labor in new employments. Such absorption is continually going on, but is not reflected in the employment statistics, according to an analysis of unemployment made by the Harvard Economic Service.

"Figures obtained by responsible governmental bureaus concerning factory employment fail to tell the whole story, not merely because they are confined to factory employment, but because, from the very nature of the case, the samples represent factories which report data regularly. Naturally these are more likely to be factories of the better grade, in which the displacement of labor through improved machinery and shop practice tends to be greater than in the average establishment.

"It is likewise noteworthy that figures for an industry do not get into the Bureau of Labor Statistics index until the industry has become well established. The result is that new industries, which may take up labor displaced by increased efficiency in older industries, go unreported in the index. Influences such as this probably account for the fact that the Bureau of Labor Statistics index of factory employment shows a decline, from 1923 to 1925, which is much greater than the decrease in employment reported by the United States Census Bureau for all manufacturing industries."

Chain Conveyor Turns Through 112 Deg.

Gasoline Engines Assembled on 480-Ft. Unit Along Two Walls —Dollies Return on Lower Side of Run



SECTION of Engine Assembly Conveyor 480 Ft. Long, Turning Through 112-Deg. on a 15-Ft. Radius. The chain is supported and held in a true segment of a circle by a steel angle curved to proper radius

SPACE limitations in the engine assembly department of the Detroit plant of the Continental Motors Corporation are responsible for the rather unusual construction of an engine assembly line conveyor recently installed by the Detroit Conveyor & Machine Co., Detroit.

When it was determined that a conveyor nearly 500 ft. long would be required, to complete all of the assembly operations on the larger types of Continental motors, it was discovered that no such lengthy space was available unless it were found possible to utilize a rather wide aisle running along the front and down one side of the assembly department. Engineers were called in to make estimates on a conveyor running along this space. But most of the plans submitted called for two conveyors, running nearly at right angles to each other and almost joining at the corner of the building. These plans would have required that part of the assembly be done on one of the conveyors, leaving the remainder to be completed on the other. This would have made it necessary to transfer the partly completed engine from one conveyor to the other, with the help of electric hoists or overhead cranes.

By using one continuous conveyor which would turn the corner of the building on a 15-ft. radius, the plan submitted by the Conveyor company eliminated all of this waste of time, power and labor. The completed conveyor, now in successful operation, is 480 ft. long and 30 in. wide, with a turn more acute than a right angle in its center—leaving a 78-deg. angle—to conform with and parallel to the walls of the building. The change in direction is 112 deg. This turn is accomplished by using a No. 678 Keystone chain, supported and held in a true segment of a circle by a piece of 2½-in. steel angle, curved to the proper radius. There is a Reeves variable-speed changer in the drive unit, with ratio 3:1. The chain proceeds at the rate of 2 ft. a minute.

Engine carriers, or dollies, are spaced 5 ft. apart along the chain. The great variety of engines produced at this plant made it necessary that these dollies be quickly adaptable to 16 types of engines. It was also necessary that the fixture supporting the engine should swivel, so that any part of the engine might be instantly accessible from either side of the conveyor. Each dolly is built of 4-in. channels riveted to a plate, which swivels on its 4-wheeled base, allowing its load to be turned around to any position.

Because of the limited width of the aisles in which the conveyor is located, it was required that these dollies be returned to the beginning end of the conveyor, underneath the top run. As the dollies are nearly the same width as the conveyor and of a greater length, they approach the end of the conveyor with corners protruding beyond the width of the conveyor at various angles, because of the varying positions in which they are left when the completed engines are lifted from them by an overhead crane. Before they can pass over the end sprockets and begin their return journey to the beginning end of the conveyor they must be righted into a position parallel with the tracks. This is accomplished automatically by loose and tight rollers about 2 ft. apart, which true up the dollies into the correct position.

At the beginning end of the conveyor the bare engine block is attached to a dolly which has just come up empty from the lower return run. When it is lifted from the other end of the conveyor it is a complete power plant. Crankshafts, pistons, connecting rods, valves, flywheel, sparkplugs, ignition cables, timing gears, distributors, coils —in short, everything—has been added in the course of the journey, by the workmen scattered along both sides of the conveyor. The complete engine, as lifted from the assembly conveyor, is ready to proceed through the testing department.

About 90 engines are on the conveyor at one time, averaging, when completely assembled, 700 lb. each.

Manganese Mined in United States in 1926

More Ore Imported to Satisfy Growing Domestic Production of Ferromanganese—Less Spiegeleisen Made That Year

A STATEMENT on manganese and its ores for the government publication, "Mineral Resources of the United States, 1926," has been prepared by J. W. Furness of the Bureau of Mines. American production of 35 per cent ore was lower than in 1925, and imports were very much higher. Lower imports of ferromanganese followed the entry of the Bethlehem Steel Co. into the market as a seller. Spiegeleisen also seemed to be used less extensively in steel making than in former years. Comparisons follow (the figures represent gross tons of ore or alloy):

American Production and Imports

	1925	1926
35 Per Cent Ore or Better:		
American production	98,324	46,258
Imports	615,000	738,000
Ferromanganese:		
American production	254,005	330,070
Imports	78,713	59,710
Spiegeleisen:		
American production	95,890	82,982
Imports	1,090	8,783

Notable changes in the American mining districts were mentioned as follows:

No shipments were made from Colorado in 1926. The Leadville area, from which much ore has come, contains large resources as compared to the known resources in other States, but apparently could not produce at a profit at prices then current.

In Montana, during 1925, the Emma mine in Butte shipped 47,469 tons of carbonate ore, but only 1263 tons in 1926. Reserves were maintained during the period of active mining, and it is believed by Mr. Furness that discontinuance was caused by low returns after the railroad freights were paid. It might be noted that a calcining plant has been erected to handle these ores within the last year. Philipsburg produced only chemical ore in 1926.

Nevada increased shipments from 850 tons in 1925 to 1607 tons in 1926; the blast furnace at Provo, Utah, absorbed this increased output.

Four shippers in Virginia produced 1998 tons of metallurgical ore in 1926; three mines shipped 1499 tons in 1925.

The Crescent Mine, on the Olympic Peninsula, Washington, was the largest single producer in the United States during 1926. Up to July it shipped 3162 tons of 51 per cent ore, but at that time its developed ore was exhausted. The total production of this mine from its discovery was 16,275 tons.

"Production of manganese ore in the United States," the author writes, "is rapidly approaching a point where materially higher prices will not, relatively speaking, increase production; the hope lies in solving the metallurgical problems of low-grade ores." Of the latter, large tonnages are in sight in the Cuyuna range, Minnesota; Leadville and Red Cliff, Colo.; Grant County, New Mexico; Phillipsburg and Butte, Mont.; Olympic Peninsula, Washington; Pioche district, Nevada; Batesville, Ark., and various places in the Appalachian Range.

India Was Largest Producer

Some of the outstanding features of the manganese industry of the world during 1926 were the increased production in India in spite of curtailed exports, the large shipments from Brazil, despite large export duties, the maintenance of production in the Gold Coast, the increased production and export to world markets of the Nikopol deposits in the Ukraine and Tchiaturi in Georgia (Russia), the heavier shipments from the Netherland East Indies, the development of Australian deposits, resumption of Chilean exports, and the prospective production of South Africa. The 1926 industrial depression in England doubtless affected the world's consumption. The price of manganese ore during that year was fairly constant except for a period of depression during the third quarter. Production of ore in gross tons follows:

Production and Exports of High-Grade Ore

	1925		1926	
	Production	Exports	Production	Exports
India	839,461	738,851	1,014,928	613,536
Brazil	326,585	302,305	256,034	311,253
Gold Coast	.....	338,657	.....	344,933
Nikopol, Ukraine	180,000	137,000	419,000	235,000
Tchiaturi, Georgia	.....	.....	750,000(a)	396,537
Dutch East Indies	.....	9,870	.....	11,047
Cuba	23,000	23,000	10,000	8,100(b)

(a) From August, 1925, to Jan. 1, 1927.
(b) None shipped since June, 1926.

One Effect of Mechanizing Industry

INDUSTRIALIZATION of the feeble-minded is reported by Ethelbert Stewart, United States Commissioner of Labor Statistics, to be resulting from the increasing use of machinery. Operation of automatic machinery which makes little demand on the intelligence has, he says, been an important factor in opening up means of employment for substandard individuals. Employment of such workers has a tendency to depress wage levels. While these workers are more docile, and thus more easily managed, than those higher in the mental scale, they are also more liable to industrial accident and when injured are less easy to rehabilitate.

Inasmuch as 45 per cent of the men given the Army intelligence tests during the World War were found with mentalities of 12 years and under, it may be estimated that nearly 26,000,000 persons in the United States of working age are of low average or inferior intelligence. The entire number of wage earners employed in manufacturing industries in 1925 was less than 9,000,000. With these facts in mind, Mr. Stewart points out the serious economic and social effects which would follow a general movement to industrialize the feeble-minded.

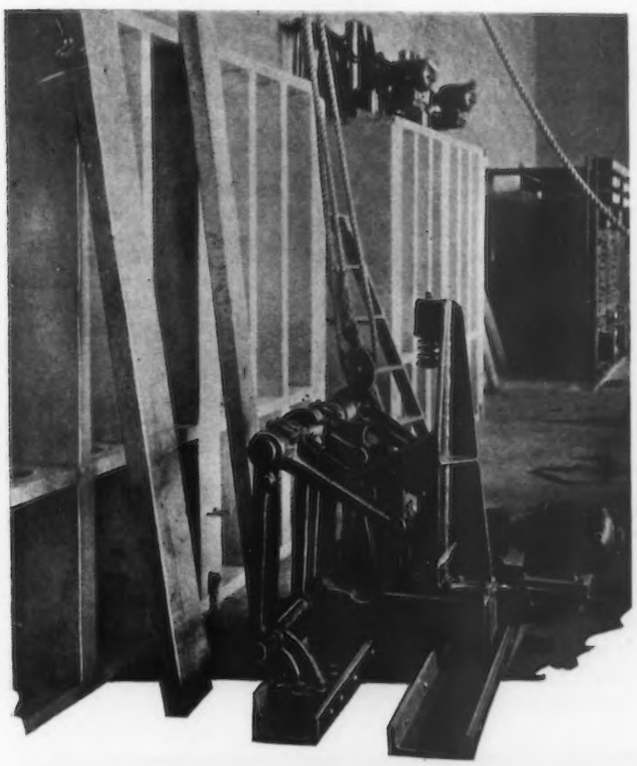
A Pacific Coast oil company, according to *Oxy-Acetylene Tips*, overhauls its pumps by reboring the cylinders and building up the bronze pistons to suit the larger diameter. A ¼-in. layer of manganese bronze requiring 54 lb. of welding rod can be welded on an old piston 6 in. wide and 30 in. diameter in 8 hours. Skillfully done, the new surface after turning and grooving is equal to a new replacement.

Steel Casing Replaces Concrete Cells

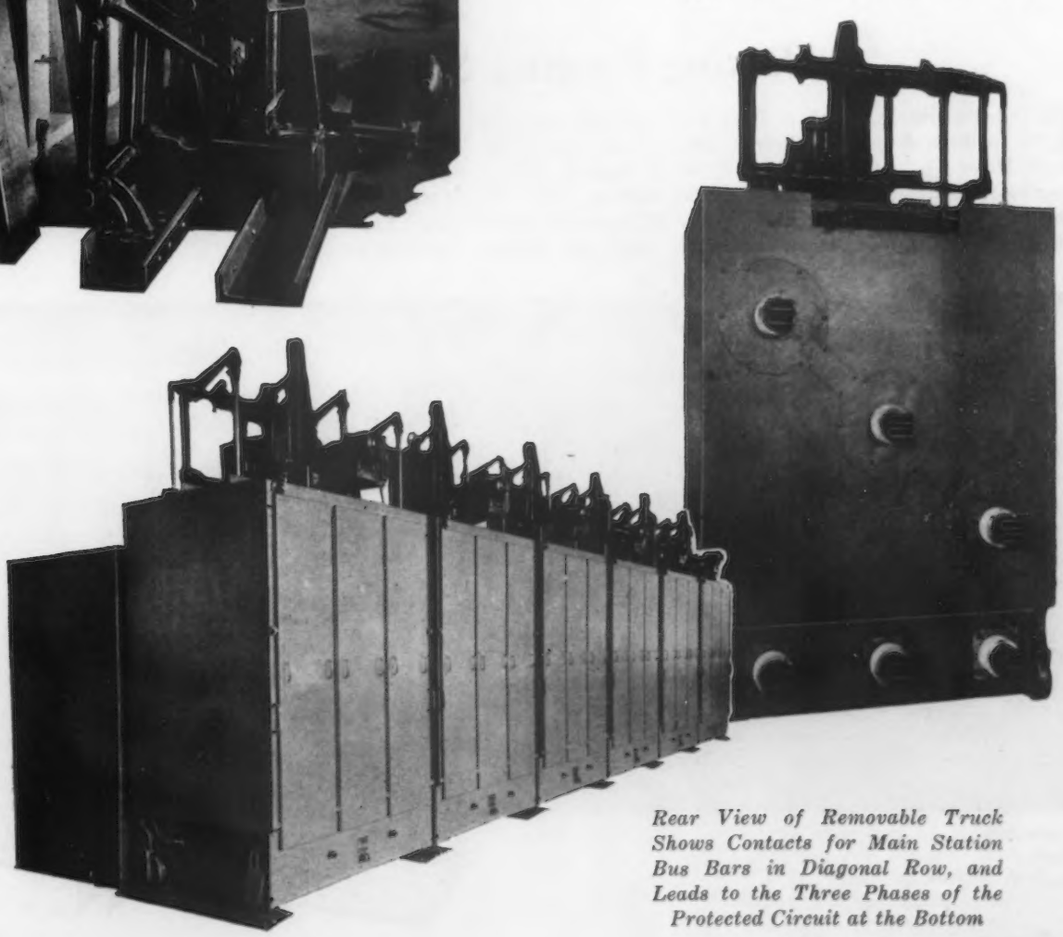
Oil Circuit Breakers Built into Steel Cabinets and Mounted on Wheels Give Many Advantages Over Older Style of Permanent Mounting in Masonry Cells

THIN steel plate is replacing more and more stone and cement in the manufacture of electrical switch gear. One item which has attracted much attention among electrical engineers and distribution men in recent years is the automatic substation and switch house. It has become standard practice to house moderate sized switches and meters, used to connect high-voltage transmission lines with branch circuits leading to small users or communities, in a steel house entirely weather proof and meddle proof. Such equipment is placed within the steel shed and completely tested by workmen in the factory, and shipped as a unit. Arriving at its destination, it is only necessary to unload the steel house upon a dry foundation, connect the incoming and outgoing lines, close the switches, lock the door and leave it alone. This switch gear automatically clears the line in case of trouble, and reestablishes the service once the fault has cleared itself, or when normal conditions of load are restored.

Lacquered steel sheets are also being built into switch board panels, replacing marble and slate, with notable advantages in lightness and ease in fabrication and erection. But the most recent and in many ways the most interesting invasion of a field preempted by brick and concrete is in the construction of cells and housings for bus bars and heavy-duty oil circuit breakers installed in electric



Concrete Cells Leave Cramped Room for Assembly or for Repairs or Adjustments



Truck-type Oil Circuit Breakers in Operating Position in Front of Steel Housing for Bus Bars

Rear View of Removable Truck Shows Contacts for Main Station Bus Bars in Diagonal Row, and Leads to the Three Phases of the Protected Circuit at the Bottom

generating stations, in the larger substations, or on lines serving consumers of considerable current.

It has formerly been the practice to place such devices in concrete cells, built into the main structure. This requires not only some expensive form work to mold the concrete, but several erecting operations on the switch gear itself. Insulators have to be carefully set, operating rods properly alined, motor driven mechanism for opening and closing the switches precisely located in respect to the other parts, vent pipes for oil vapors connected, and all the secondary circuits for operating motors and signal lights installed. Such erection work is so intricate that the General Electric Co.'s instruction pamphlet for the installation of these oil circuit breakers is 48 pages long, and illustrates and describes no less than 21 construction operations, each of which must be performed in the powerhouse, in cramped, often dusty, surroundings, and usually by workmen unfamiliar with the work in hand.

All this equipment has now been sectionalized and built into self-contained sets, as shown in the accompanying reproductions of photographs. The removable truck is a steel-inclosed unit, constructed entirely of steel plates bent to form and welded together into a strong, rigid, self-supporting structure. Sheet steel barriers, placed between the three circuit breakers (one on each phase) divide the truck into separate compartments. Into these compartments the circuit breaker is completely erected and tested in the factory, where the facilities for such work are of the best. The power station merely has to provide the necessary smooth floor space and connect the cabinets with the incoming and outgoing lines. The convenience to the purchaser is obvious. A material saving in floor space is also effected.

An even greater advantage of the steel truck panels is their safety. The new steel construction not only removes many grave risks of accident to the operating staff, but also reduces the frequency and liability of interruption to service. Should the breaker be damaged, or need a periodic inspection, it is unnecessary for the electrician to wriggle into a tight concrete cell, in close proximity to live circuits carrying heavy voltage and current. He merely rolls the truck out and replaces it with a spare, held in reserve.

Steel is also a material which lends itself excellently to interlocking devices for the safety of the workmen. When the breaker is closed and current is passing through it, a small hand lever operating the locks at the upper corner cannot be moved. When the breaker is open and no current is passing through, the lever may be turned to the left, which opens a switch in the motor drive (the breaker cannot then be closed by another person at a distance) and raises an anchor holding the truck in service position. The truck may now be withdrawn, but the doors cannot be opened. When the truck is pulled out, sliding doors drop over the opening into the bus-bar cells, thus preventing accidental contact with live lines. The hand lever can then be thrown to the right, and the doors in front of the circuit breakers removed. When any door is opened, a spring latch locks the hand lever, so it cannot be moved until all doors are back in place.

Taken as a whole, the development of the steel-inclosed units for central station work has resulted in economies and conveniences to the manufacturer, the central station, the electrician and the current buyer. The manufacturer does all the erection in his shop with specially trained workmen. The purchaser thus gets a more compact, reliable and better adjusted device. The substation operator has a far safer place to work, and the ultimate consumer of electricity gets nearer the goal of absolutely uninterrupted current supply. All this is made possible by the substitution of light steel sheet as a construction material for the bulky immovable concrete.

Heating Forging Steel by Electricity

IN the illustration, which is from a photograph taken in the spring and upset building at the Fordson plant of the Ford Motor Co., are shown two types of typical electric forging furnaces such as are used for heating stock for the forging of gears and other work of this character. The heating elements in the one at the right are Globar resistors, while those in the other are of the trough resistor type—troughs of silica carbide containing granular graphite. There is a large electrode at each end. Both furnaces operate at a temperature of approximately 2350 deg. Fahr. There is a forging machine alongside each heating unit.

Improved Machines for Railroad Use

Two-Spindle Rod Borer Has Attachments for Wide Range of Work—Motor-Actuated Table Provided for 100-Ton Bushing Press

TWO machines built recently by the Niles Tool Works division of the Niles-Bement-Pond Co., 111 Broadway, New York, for use in railroad shops, are shown in the accompanying illustrations. One is a two-spindle heavy-type rod borer for a large Western railroad, and the other, a new 100-ton bushing press.

In addition to modern features of design, the rod-borer is equipped with a number of attachments which adapt it for a wide range of boring and facing operations on locomotive connecting rods.

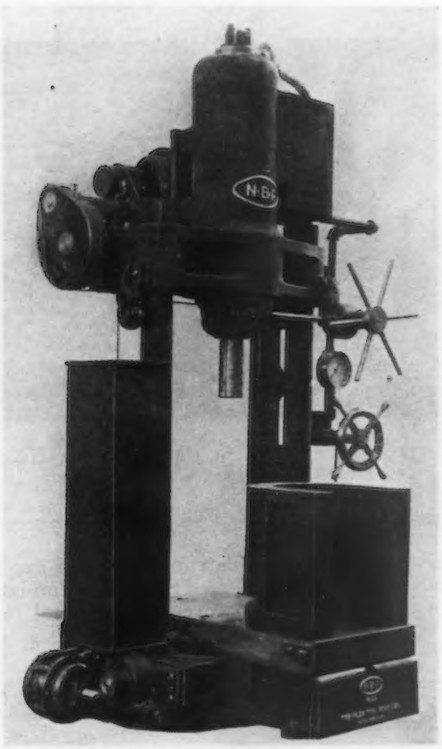
Each spindle is driven by individual variable-speed direct-current motor of 15 hp., which provides a range of spindle speeds from 8 to 140 r.p.m. The motors are mounted back of the crossrail, one on each end, and drive the spindles through gear boxes. The final drive is by worm and worm-wheel, the worms being provided with ball thrust bearings to assure a smooth drive suitable for heavy trepanning.

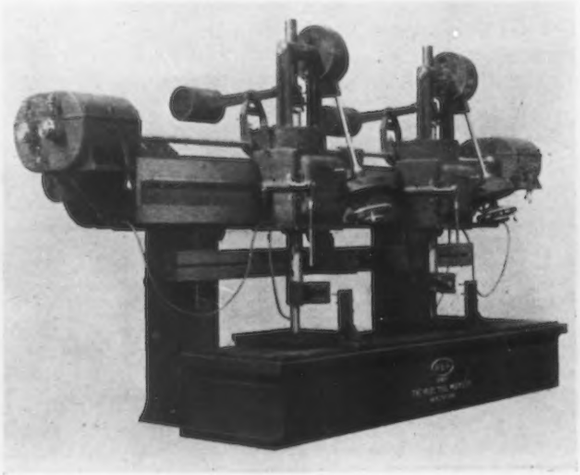
The spindles, 5½ in. in diameter in the driving gear and 8 in. at the lower end, are of hammered high-carbon steel. The vertical travel of the spindles is 22 in. In addition to rapid hand adjustment, fine hand feed and six automatic geared feeds, from 0.005 to 0.165 in. per revolution, are provided. Spindle saddles are adjusted along the rail by rack and pinion. The minimum distance between spindle centers is 36 in. and the maximum distance is 14 ft. 2 in. The maximum distance from the top of the table to the end of the spindle is 30 in.

A lower rail support is bolted to the housings for steadying the ends of the spindles when using trepanning cutters or box tools. Spindle guides may be moved out of the way and the rail elevated so as not to interfere with the use of pilot bars. Two movable work tables with bushed holes in their surfaces are also provided for use in connection with boring bars with pilots at their lower ends. These tables are tongued and grooved to the main table and have facilities for clamping in position. For machining bosses on certain types of rods, each spindle is equipped with a facing head having a pilot bar which is guided by a bushing in the movable work table. The feed to the facing head is of the star type. Two independently driven pumps are provided for circulating the cutting fluid.

The 100-ton bushing press is motor driven and is equipped with a special sliding table, which is mounted directly on the baseplate and is traversed in and out by a 1-hp. reversible motor. On this table is a heavy cast-iron block or step with a U-shaped opening, on which the driving boxes would be supported when pressing out the brasses. This block may be removed when desired. It has three pins at the bottom that engage corresponding holes in the top of table for centering under the ram of press. The motor is controlled by push-button, and suitable limit switches are provided to prevent overtravel of the table in either direction. Power from the motor is transmitted to the table through worm gearing and rack and pinion.

Pressing in or out of brasses 20 in. long is within the capacity of the machine. The stroke of the ram is 24 in. The width between the tension bars is 34 in. and the maximum height between the top of the sliding table and the ram is 43½ in. The pump, of two plunger type, is driven by a direct geared 7½-hp. motor.





EACH Spindle of the Rod Borer, Shown Above, Is Driven by a Separate 15-Hp. Variable-Speed Motor. A lower rail support is bolted to the housings for steadying the spindles when using trepanning cutters or box tools

The Bushing Press, at the Left, Has a Special Sliding Table, Which Is Traversed In and Out by Motor

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Nearly 400 acres will be covered by London's reconstructed Croydon airport which is nearing completion, according to reports received by the Department of Commerce from Trade Commissioner William M. Park, London. More than $1,000,000 has been spent on improvements.

Rotary compressors are covered in a 40-page pamphlet of R. Planche & Co., Villefranche, France. The study, in English, takes up several methods of design and operation.

Brick Cleaning Machine for Rapid Operation

FOR reclaiming open-hearth checker brick, blast-furnace brick, soaking-pit brick, building brick and paving brick, the Rotor Air Tool Co., Cleveland, has put a new model machine on the market. It is claimed that the machine removes the scale from refractory and regenerative brick, clay from blast-furnace brick, and mortar and cement from paving and house brick. It may be used also for cleaning skewbacks and for the general shaping of brick.

Below the main table is mounted a main shaft running in four Hyatt roller bearings. Two special cutting heads containing the cutting members are mounted on this shaft, with special provision for quick and convenient installation and removal of cutters. The two cutting heads project slightly through two slots or ports in the table. The table itself is hinged at the back end, with a positive screw adjustment to raise or lower its forward end. This adjustment gives the desired amount of contact and blow required for the brick being cleaned. The bricks are handled in exactly the same manner that a piece of wood is planed or shaped on a wood jointer.

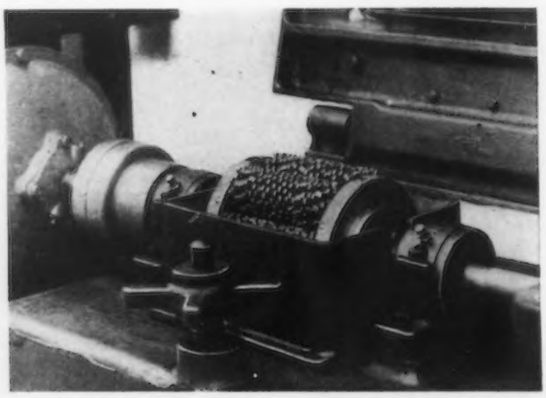
The openings in the table are directly connected to an exhaust blower which drives to a convenient place the dust and lighter material removed. Immediately below the cutter heads two automatic dump doors are mounted. These are counterbalanced so as to trip and discharge waste material automatically as an accumulation is formed.

Four aluminum guards mounted with rubber tires appear above the tables. These guards open up as the brick passes over the cutters and then close automatically. They are controlled by a spring appearing in the detailed view, being so adjusted as to offer practically no resistance to opening for the brick. They do not act as guides, as the brick can be passed through them at any angle.

A fully inclosed, dust-proof motor of ample power, with variable-speed control and push-button starter, is provided. This motor is direct connected to the main shaft through a flexible coupling. The entire machine is mounted on a four-wheel truck arrangement with a heavy steel tongue, which makes it readily portable and permits it to be rolled from place to place, or to be pulled by a tractor.

It is claimed that with a crew of three men this machine will clean 3000 9-in. bricks in a 10-hr. day. Two men feed brick through the two halves of the machine, while the third man stacks the cleaned bricks. This compares with maximum production of 900 9-in. bricks for three men under the usual hand-chipping methods. Tests have shown that the cost is usually less than 1c. per brick, including interest on investment, cost of cutters, current consumption and direct labor cost.

Each head on the machine delivers 600,000 blows a minute. The surface of the finished brick is left entirely free from scale, and it is claimed the breakage is practically negligible, because of the lightness of the individual blows. The machine may be adjusted to perform satisfactorily on a great variety of sizes and types of brick. Patents have been applied for in the United States and foreign countries, to cover the essential features.



Cutter Guard Disks in General View Hide the Cutters, Shown in Detail Above

Properties of Metals at High Temperatures

Progress in investigations of the effect of temperature on properties of metals is reported by G. W. Saathoff, chairman of the joint committee having the work in charge for the American Society for Testing Materials and the American Society of Mechanical Engineers. The committee's series of long and short-time tests on a variety of metals are being continued through the cooperation of some twenty industrial and government laboratories. As these tests must be fitted into the routine schedule of these concerns, results, it is emphasized, will necessarily be somewhat slow in developing.

With the financial support of a group of steam-turbine manufacturers fatigue tests on metals at elevated temperatures are about to be started at the University of Illinois Engineering Experiment Station under the direction of Prof. H. F. Moore. From a year to 18 months will be required to complete this investigation.

Arrangements are also being completed with another university for the conduct of a group of thermal conductivity tests on the five classes of metals now being investigated by the 20 laboratories mentioned above.

Of particular interest is the announcement by the committee that a large amount of service information on alloy metals at elevated temperatures has been collected from industry and tabulated. Publication of these data may be expected shortly.

Non-Technical Bulletins on Welding

An elementary discussion of the relation between carbon and the properties of welding rods and joints made therewith is contained in Bulletin No. 128 of the Fusion Welding Corporation, 103d and Torrence Avenues, Chicago. It is planned to issue an extended series of such pamphlets considering various phases of the art, and these publications will be sent to anyone interested on request.

Tumbling Barrel Avoids Handling of Stars and Sand

A NEW type of tumbling barrel has been brought out by the Ideal Industrial Machinery Division, Winton Place, Cincinnati. Known as the star return tumbling barrel, it was especially designed for cleaning drop forgings, heavy stampings and castings. The complete line includes machines of several sizes and capacities, ranging from those having an 18 by 24-in. tumbling compartment, and a load capacity of 150 lb., to those having a 48 by 60-in. compartment with a capacity of 4000 lb.

Essentially the machines consist of a tumbling barrel, driving motor and speed-reduction mechanism, mounted as a unit on a heavy structural steel frame. The frame is constructed of steel angles, strongly braced by stretcher members and gusset plates, which give it rigidity to withstand the shocks and continuous vibration encountered during operation.

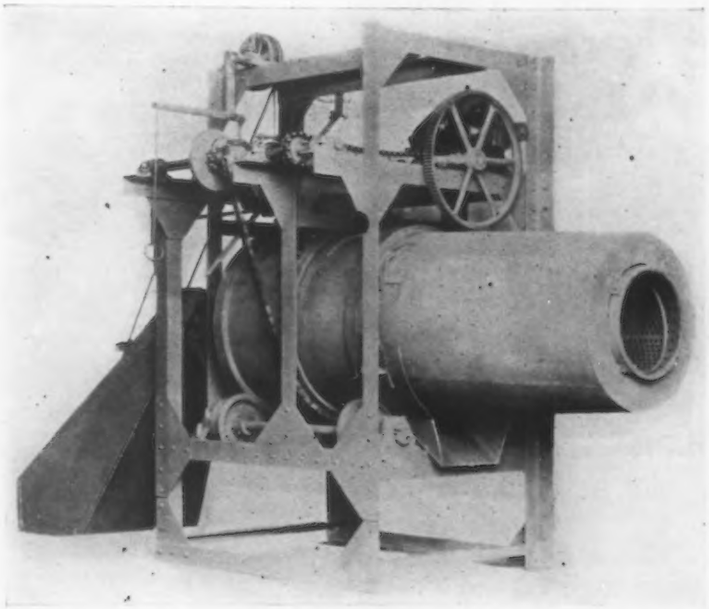
Both the barrel proper and the lifting and lowering motions of the loading scoop are chain driven from a common shaft. This in turn is driven through a gear and sprocket reduction train by a reversing motor. Control of the direction of rotation of the barrel is by reversal of the motor, and that of the lifting and lowering of the scoop by a friction hoist driven from the countershaft. The countershaft has a brake for control of the skip, during lowering.

The barrel is mounted on four trunnion rollers, the two on each side being mounted on a common shaft, supported in pillow blocks equipped with Timken bearings. The selection of the bearings was determined by their ability to withstand the heavy, fluctuating loads caused by the tendency of the contents of the barrel to climb part way up one side, and fall back against the direction of rotation. The housings are designed to hold a large reserve supply of lubricant, and to exclude dust, sand and grit.

The barrel is divided vertically into two compartments, the tumbling or cleaning compartment and the separating screen compartment. The work is tumbled with stars, or sand, together with flint shot, silica sand or steel sheet, the stars being equal in weight to the work. The parts to be cleaned are prevented from touching each other, being floated among the stars and sand. Tough scale can be removed without denting or destroying the corners of the parts, or injuring designs cast or forged on them.

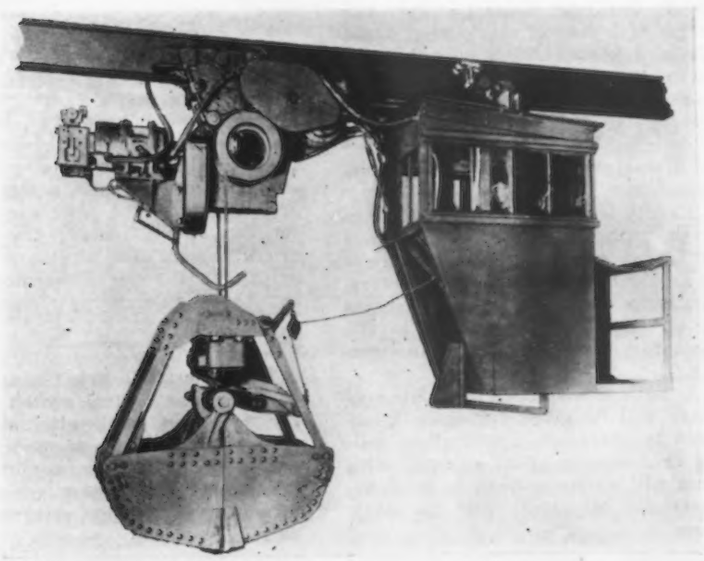
When the run is completed, the work is discharged by reversing the direction of rotation of the barrel. This causes the mixture of sand, stars and work to pass into the screening compartment, where the stars and sand are screened and cleaned work is delivered at the end of the screen.

The stars and sand fall into the cone shaped jacket surrounding the screen and, when the barrel is again rotated in the tumbling direction, are automatically returned to the tumbling compartment. The transfer is accomplished through a patented cup arrangement, located in the head between the tumbling compartment and the screen jacket.



Operation Includes Automatic Separation of the Work from the Sand and Stars, Without Need for Handling the Latter

Monorail Trolley Hoist With Bucket

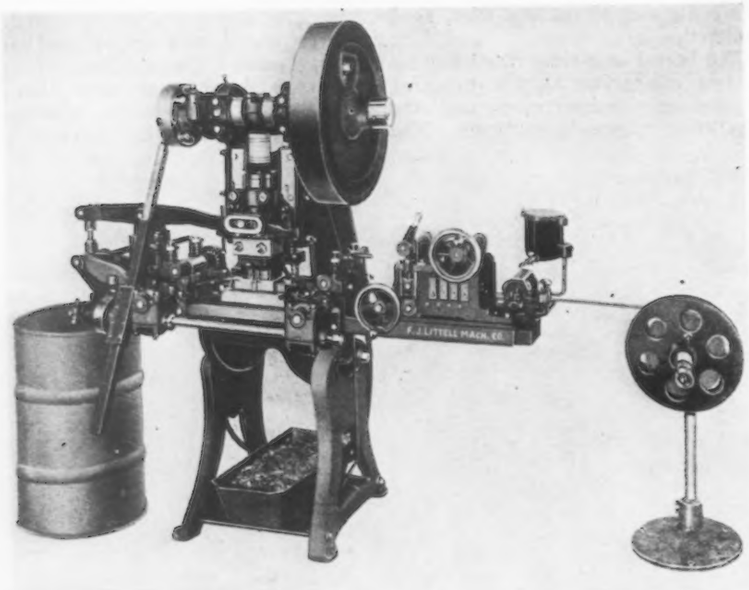


A MONORAIL trolley brought out by Edgar E. Brosius, Inc., Sharpsburg, Pa., is shown in the illustration. A number of the devices have been in service in steel plants for the past three or four years. They are of rugged construction and were designed for severe, continuous work, being built entirely of steel.

The hoist is equipped with a simple worm-gear drive. It is furnished with a hook block for handling the Brosius single-hook bucket, or the bucket can be reeved directly to the drum, as shown. The worm drive requires only a simple magnetic brake on the hoist motor for holding the load, in conjunction with dynamic braking control.

The hoist is equipped with Timken roller bearings. The trolley is simple in design, its drive being of the spur-gear type. Compactness is a feature which is emphasized.

Nine-Roll Straightener for Springy Stock



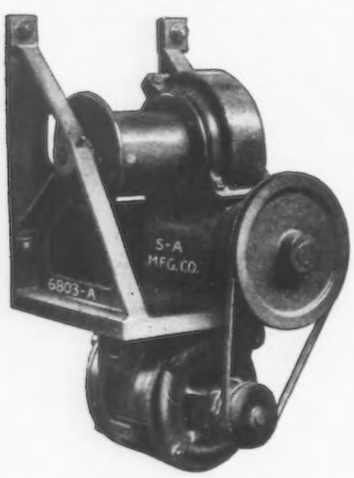
The Straightening Device Is for Light Springy Stock and Includes a Hand Feeding Mechanism

THE F. J. Littell Machine Co., 4125 Ravenswood Avenue, Chicago, has added to its line a new nine-roll straightener designed particularly for light and springy stock. This new unit, designated as the No. 2, is for material 3½ in and less in width. A No. 3 size, with seven rolls and intended for stock up to 5 in. in width, is also available.

The device is arranged with a hand-driven feeding mechanism, so that it need not be used with a roll feed. Use of a hand feed of this type is stressed as of particular advantage when long strips have to be fed from coils and straightened. The device can be set on a table next to the power press and the stock fed to any desired length. The straightener may be used also in connection with a roll feed and can be supplied with an oiler if desired. The rolls are small and are set close together. The equipment illustrated includes a rack and pinion feed with the nine-roll hand feeding straightener and scrap cutter.

Motor-Driven Winches Arranged for Wall and Floor Use

TWO styles of reversible motor-driven winches, one arranged for wall mounting and the other for floor use, have been made available by the Stephens-Adamson Mfg. Co., Aurora,



Ill. The machines are compact and offered for a variety of applications, including the lifting of castings, light machinery, furnace doors, ventilators, walkways, counterweights, light elevators and small bridges.

The machines are equipped with worm gear reduction units which prevent accidental dropping of the load. Both the winch for wall mounting, designated as the style WK, and the machine for floor or pedestal mounting, the style K may be equipped with 1, 1½ or 2-hp. reversible electric motors. They are rated to pull 700-1100 and 1400 lb. respectively, at a rope speed of 25 ft. per min. Use of ¼ or ⅜ in. cable is recommended, the drums being designed to accommodate 100 ft. of ¼-in. and 60 ft. of ⅜-in. cable. All gears have cut teeth and operate in oil. The worm is fitted with ball thrust bearings which permit free operation in either direction.

Evening Course Offered in Diesel Engines

TO meet the demand for information concerning the particulars and operation of Diesel engines, an evening course is offered by the Polytechnic Institute, Brooklyn. This will be the fifth year of this course, about 400 men having taken advantage of it in the four years which have elapsed. The course is not part of the regular undergraduate work, but is designed solely for men interested in oil engines, regardless of previous education.

Twenty lectures, each of 2 hr., are given during the winter, on Tuesdays at 7.30 p. m. The first lecture will be on the last Tuesday in September, this being Sept. 25. Several varieties of oil engines are available in the laboratory for demonstration and testing.

A lecture course on Monday evenings will be given for those interested in operation, construction, selling or designing of oil engines. This class will alternate week by week between the laboratory and the classroom.

Pliers with Jaws That May Be Locked

PLIERS which take their name, Lok-Jaw, from the arrangement whereby the jaws may be locked to nuts, bolts and other objects in the manner of a hand vise, have been added to the line of the Lawson Mfg. Co., Cleveland. The device is arranged with an adjusting screw at the jaws and the compound leverage is said to provide a 1-ton grip at the jaws. The latter

are designed to fit round, square or hexagon objects.

The pliers may be clamped to a loose nut or bolt head in an inaccessible place, and will keep the nut or bolt from turning while it is being loosened or tightened with a screwdriver or a wrench. The jaws are of steel forgings, heat treated; the handles are of pressed steel and have knurled grips. In the size illustrated, the 8 in., the maximum jaw opening is ¾ in.

The General Electric Co. announces a new motor control switch suitable for reversing small alternating-current motors. The new switch is expected to find a wide application on general-purpose motors when either infrequent or frequent reversing is required.

Automatic Stock-Feed Facilitates Production of Pipe Coupling Blanks

PIPE couplings are produced on a high-production basis on the machine illustrated, a feature of which is the automatic roll stock-feed mechanism employed. The machine is a modification of the 1½ and 2-in. four-spindle bar machine of the Cleveland Automatic Machine Co., Cleveland.

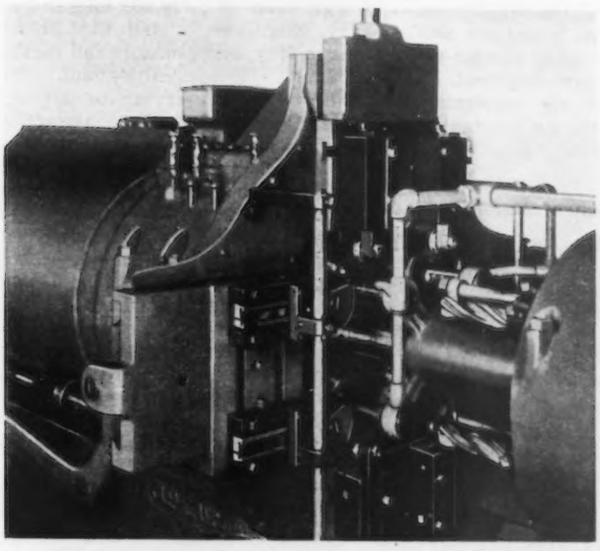
The pipe coupling blanks are produced from hot rolled stock rods which are 1 9/16 in. in diameter and 35 ft. long. The machining operations, consisting of drilling, forming the corner of the outside diameter, stenciling the manufacturer's mark and cutting-off, are performed simultaneously, so that four blanks are produced at each stock feed.

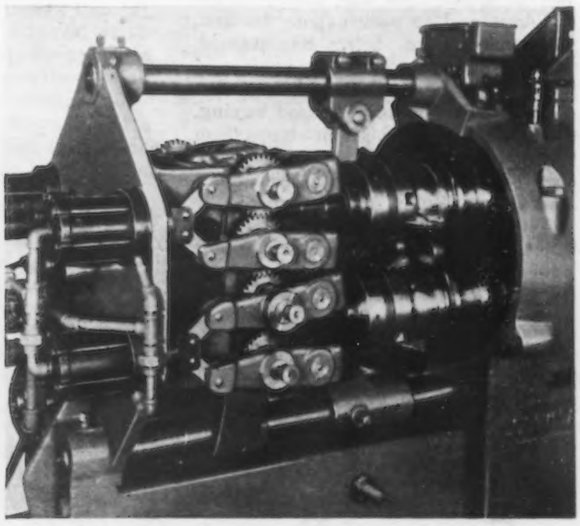
The V-shaped feed rolls, mounted on toggle arms, are continuously driven by a system of gears actuated by chain and sprocket which is geared to the lower camshaft in the rear. Cams on the same shaft control the action of air cylinders, which govern the roll mechanism, and four pistons impart a jaw action to the toggle arms carrying the rolls. Each pair of arms closes on a bar independently of the others and therefore variation in the size of a bar does not affect the feeding of any other bar. The four bars of stock are gaged by four stops which are mounted on a central drive shaft sleeve and have longitudinal movement with the sleeve. After gaging the stock, the stops are withdrawn slightly for chip clearance, and simultaneously a sliding shoe, actuated by a cam and drum on the lower shaft, operates four thimbles which close the chucks. Compression springs back of the finger block compensate for any irregularity in the stock. The feed rolls release the stock by a reversal of the air current which reverses the jaw action of the toggle arms.

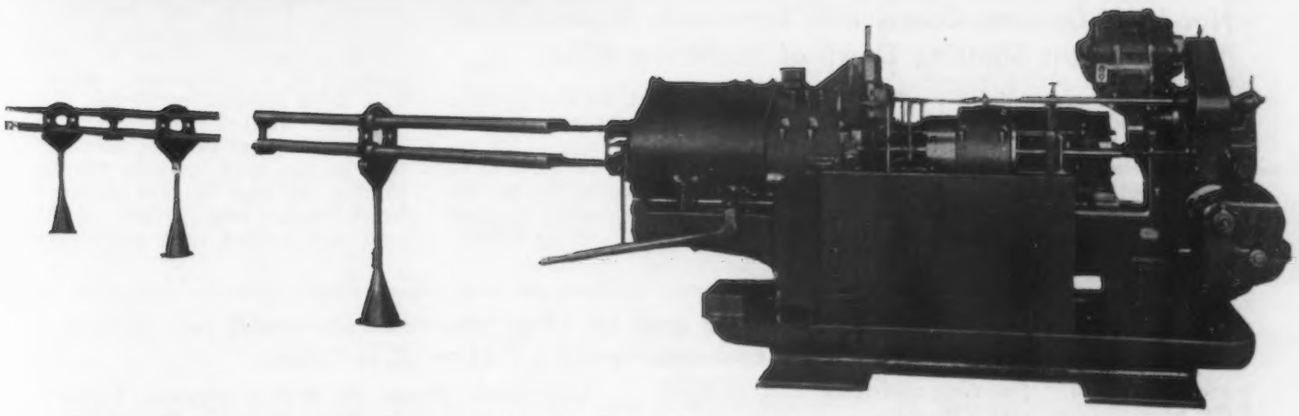
When the gage stops recede, the turret advances, bearing four drills which operate through openings in the gage stops, so that the latter act as tool guides and strippers. The turret is non-indexing. Simultaneously, tools mounted on four cross slides form the corners of the outside diameter and cut off the blanks. Stenciling is accomplished by a pivoted sector which advances with the slide and rolls the manufacturer's mark into the blank with the motion of the stock, being held out of position after one pass. Stripping four blanks and gaging stock for the next four is accomplished by a single forward motion of the gage stops. The installation includes a support for the 35-ft. rods, consisting of four tubular housings held at intervals by adjustable standards.

Subsequent beveling of the mouth of the hole is performed on a special model J double-end machine of the Cleveland Automatic Machine Co. design, after which the pieces are tapped.

A machine of the same design as the one described and illustrated above, but without the roll feed, has been designed for use in the manufacture of nuts.







ARRANGEMENT of the Automatic Roll Stock-Feed Mechanism, Used on the Cleveland Automatic for Machining Pipe Coupling Blanks, May Be Noted from the View at the Upper Right. The machining operations consist of drilling, forming the corner of the outside diameter, stenciling a mark and cutting off—all of which are performed simultaneously, so that four blanks are produced between each stock-feed

Curtailment of Operations in Europe

British Holidays Interfere With Business—Germany Facing Shutdowns in Many Mills—Weak Markets in Belgium

(*By Cable*)

LONDON, ENGLAND, July 23.

DEMAND for Cleveland pig iron is at a very low ebb, owing to the holidays and to poor export demand, but prices are being maintained. Hematite is dull and stocks are heavy.

Foreign ore is quiet. Northeast Coast consumers have ceased buying, as prices are too high in comparison with what they can get for their pig iron. The Swedish strike continues, and Bilbao Rubio ore is firm.

Finished iron and steel markets are quiet. Some new shipbuilding orders have been placed, but makers are relying on domestic structural and engineering demand. Export markets are virtually idle. The prime minister is to receive this week another deputation from the iron and steel industry, urging that safeguarding remedies [protective tariff?] be applied.

Tin plate markets are quiet and prices are easing. Welsh makers having decided to reintroduce a restriction of output, all mills are to close for two weeks during the period Aug. 27 to Nov. 24. Some works are well sold, but others are ready to take orders specifying August shipment.

Galvanized sheets are moderately active in small parcels, but substantial demand is still lacking. Black sheet markets are quiet.

On the Continent of Europe

Continental markets are firm, especially on semi-finished products. On merchant bar covering, billets are reported unobtainable. British demand is poor.

Russian production in the fiscal year 1926-1927 was as follows:

	Metric Tons
Pig iron	2,963,000
Raw steel	3,586,000
Rolled steel	2,730,000

In 1927 the average monthly home consumption of iron and ingot steel was 1,484,000 metric tons; in 1926 only 883,000 tons; and after rising to a high point of 1,718,000 tons in January, this year, it fell to 1,315,000 tons in May, and probably fell further in June. Municipalities and other public bodies are trying to devise a system by which public construction, including communications, shall be so far as possible concentrated in bad trade periods, thus mitigating the production fluctuations and consequently equalizing employment.

Orders for steel are coming in very slowly, and the mills largely depend upon old orders given before prices were raised in May. The demand for structural steel has not fallen further, but large orders are not being received. The bar market is quieter, with shorter delivery terms. Sheets are dull. For semi-finished products the demand has declined.

The dullness in export is partly connected with the Antwerp dock strike. Meantime, competition is sharp, and prices are slightly depressed. French and Luxemburg works are maintaining their prices to European buyers, but are exporting overseas at a considerable sacrifice, bars being exported at £5 12s. f.o.b. ($27.22). Until this new export dullness, which began in June, Germany's iron foreign trade balance was improving. In May the net export of heavy iron and steel (without machinery) was 212,000 tons, the highest

Germany Expects Steel Curtailment

Not Even Greatest Conceivable Increase in Exports Can Prevent Shutting Down of Numerous Mills

BERLIN, GERMANY, July 7.—The home market has further weakened since the beginning of the month, and export is developing less satisfactorily. Düsseldorf experts declare that the maintenance of production in the second half of the year will depend largely upon export, but add that if a really bad trade condition arrives the greatest conceivable increase of exports will not prevent closing down of numerous mills, because the fluctuations of home consumption in good and bad trade periods are too great.

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.86 per £ as follows:

Durham coke, del'd	£0	17½s.	to £0	17¾s.	$4.25	to	$4.31
Bilbao Rubio ore*	1	2½			5.48		
Cleveland No. 1 fdy	3	8½	to 3	9½	16.64	to	16.89
Cleveland No. 3 fdy	3	6			16.04		
Cleveland No. 4 fdy	3	5			15.80		
Cleveland No. 4 forge	3	4½			15.68		
Cleveland basic (nom.)	3	5			15.80		
East Coast mixed	3	8	to 3	9	16.53	to	16.77
East Coast hematite	3	10½			17.13		
Rails, 60 lb. and up	7	15	to 8	5	37.66	to	40.10
Billets	6	0	to 6	15	29.16	to	32.81
Ferromanganese	13	15			66.83		
Ferromanganese (export)	13	0	to 13	5	63.18	to	64.39
Sheet and tin plate bars, Welsh	6	0			29.16		
Tin plate, base box	0	18	to 0	18¼	4.37	to	4.43
Black sheets, Japanese specifications	13	7½			65.00		
					C. per Lb.		
Ship plates	7	12½	to 8	2½	1.63	to	1.74
Boiler plates	9	0	to 10	10	1.92	to	2.25
Tees	8	2½	to 8	12½	1.74	to	1.84
Channels	7	7½	to 7	17½	1.58	to	1.69
Beams	7	2½	to 7	12½	1.53	to	1.63
Round bars, ¾ to 3 in.	7	5	to 7	15	1.55	to	1.66
Steel hoops	9	0	to 10	0	1.92	to	2.14
Black sheets, 24 gage	9	15	to 10	0	2.09	to	2.14
Galv. sheets, 24 gage	13	7½			2.86		
Cold rolled steel strip, 20 gage, nom.	16	0			3.42		

*Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

	(Per Metric Ton)						
Foundry pig iron (a):							
Belgium	£3	3s.	to £3	5s.	$15.32	to	$15.80
France	3	3	to 3	5	15.32	to	15.80
Luxemburg	3	3	to 3	5	15.32	to	15.80
Basic pig iron (nom.):							
Belgium	3	1	to 3	2	14.82	to	15.07
France	3	1	to 3	2	14.82	to	15.07
Luxemburg	3	1	to 3	2	14.82	to	15.07
Coke	0	18			4.37		
Billets:							
Belgium	4	15½			23.21		
France	4	15½			23.21		
					C. per Lb.		
Merchant bars:							
Belgium	5	14			1.26		
France	5	14			1.26		
Luxemburg	5	14			1.26		
Joists (beams):							
Belgium	4	17½	to 4	18	1.07	to	1.08
France	4	17½	to 4	18	1.07	to	1.08
Luxemburg	4	17½	to 4	18	1.07	to	1.08
Angles:							
Belgium	5	10	to 5	12½	1.21	to	1.24
⅛-in. plate:							
Belgium (a)	6	11			1.44		
Germany (a)	6	11			1.44		
⅞-in. ship plate:							
Belgium	6	7			1.40		
Luxemburg	6	7			1.40		
Sheets, heavy:							
Belgium	6	1			1.33		
Germany	6	1			1.33		

(a) Nominal.

figure reached for more than a year. The average monthly net export in January-May was around 160,000 tons, as against 137,000 tons in 1927.

Reports from France and Belgium indicate that no material rise in iron and steel prices is expected for the present. The stabilization of the French franc will not, it is held, have any effect in restoring real gold prices for some time to come. This is deduced from the experience of Belgium, whose currency has been stable a long time, but whose price level and wages have not yet returned to a gold basis. The German *Stahl und Eisen* predicts that the devaluation of the French franc to about one-fifth of its old value will create permanently favorable competition conditions for France. This means that Germany will continue to export in competition at below her home prices and even below her production cost. Her financial ability to bear this strain seems beyond doubt. The *Frankfurter Zeitung* publishes a minute analysis of German corporation profits with the aim of disproving the contention of steel manufacturers that the recent industrial boom was a "quantity boom" and not a "profits boom." The amount paid in dividends by 85 leading corporations in different branches has moved as follows since the mark stabilization:

	Marks
1924	171,300,000
1925	218,600,000
1926	273,600,000
1927	357,900,000

The steel and coal corporations have done best of all, if not merely their dividends, but also the additions to their reserves, are taken into account. Their real earnings, without counting unrevealed additions to reserves, increased about five-fold in the three years 1924-26. Of the 85 corporations in all industrial branches, 29 paid no dividends in 1924, and only five in 1927; whereas 28 paid over 10 per cent in 1927, against only four in 1924. This analysis of corporation profits agrees with that of the official Trade Fluctuations Institute, which classes steel as one of the industries which is financially strong enough to export at a loss in times of bad home trade.

Belgian Market Tendencies Weak

ANTWERP, BELGIUM, July 6.—Market tendencies continue weak, but prices remain stationary. The general strike of dock workers in the harbor of Antwerp has made shipments impossible from this port and shipments by other ports are not easily arranged. Stocks are accumulating at steel plants, forecasting reductions in operations.

The decision of the Steel Cartel not to increase production during the quarter will support makers in their resistance to price reductions. Another factor favorable to Belgian mills is the weak competition from Germany. Important orders have been taken by the Rail Syndicate in South America; Belgian railroads are expected to make large purchases, and it is known that large requirements are pending in the East, where it is generally expected that buying may start very soon.

Steel bars show a narrow market on account of the limited production and owing to the fact that most makers are open only for a part of their program. German makers are entirely out of the market. The French and Luxemburg competition puts forward the same prices that are quoted here. Angles are now offered freely and prices have been influenced. Structural rounds maintain a stronger position on account of lack of stock. Beams have strengthened. Rods remain scarce and firm.

Pig iron remains stationary in price. The export demand is not good. The lowest price, about $15.40 f.o.b. Antwerp, seems to meet with strong foreign competition.

Canadian Iron and Steel Production

June Considerably Ahead of June Last Year and Half-Year Output Highest in Ten Years

TORONTO, July 23.—The production of pig iron in Canada for the month of June totaled 97,379 gross tons, a gain of 11 per cent over the 87,811 tons produced in the previous month and 40 per cent higher than the 69,437 tons produced in June last year. The production of basic iron increased to 69,040 tons from 68,945 tons in May; foundry iron from 7667 tons in May to 25,968 tons in June; but malleable iron fell off to 2371 tons in June as compared with 11,199 tons in the previous month. For the first half of 1928 the cumulative production of pig iron is 468,013 gross tons as compared with 403,713 tons in the corresponding six months of 1927. This year's output included 355,802 tons of basic; 88,076 tons of foundry iron and 24,135 tons of malleable iron.

The production of ferroalloys in June totaled 4157 tons or about 3 per cent more than the output of 4049 tons of May.

The output of steel ingots and castings during June totaled 116,530 gross tons or slightly less than the 117,655 tons produced in May, but 94 per cent greater than the 59,940 tons made in June, 1927. The output of steel ingots amounted to 112,960 tons and of direct steel castings 3570 tons.

For the first half of this year the cumulative production of steel ingots and castings is 648,338 gross tons, an increase of 33 per cent over the 487,310 tons made in the corresponding period last year. This year's output to June included 625,493 tons of steel ingots and 22,845 tons of direct steel castings.

While the Canadian price of pig iron was unchanged during June, the price index of the Dominion Bureau of Statistics for iron and steel (1913—100) fell from 141.7 in May to 140.9 in June, owing to slight declines in the prices of steel bars and steel sheets.

During the month of June 8 blast furnaces were blowing as follows: three of Algoma Steel Corporation, Sault Ste. Marie, Ont.; two of Steel Co. of Canada, Ltd., Hamilton, Ont.; one of Canadian Furnace Co., Port Colborne, Ont., and two of Dominion Iron & Steel Co., Sydney, N. S.

The production of iron and steel in Canada for the first half of 1928 proceeded at a higher monthly average than either 1926 or 1927, and even passed the high average of 1923. Output was below that of 1913, however, and was only about half of the high record established in 1918 when 1,622,000 tons of ingots were produced.

Production figures from 1923 to the middle of 1928 are shown in the table at the bottom of the page.

German Tube Makers Feel American Competition

HAMBURG, GERMANY, July 6.—The German Tube Makers' Association reports that business in tubes for export to overseas countries has recently improved, but that prices are still very low because of the growing firmness of American competition, especially in the Latin American countries.

Germans Reduce Wire Rods to Regain Japanese Trade

HAMBURG, GERMANY, July 6.—A conflict has recently broken out in the German Wire Rod Cartel concerning the trade with Japan, which was taking from 5000 to 8000 tons of German rods a month until the price advance in May, when sales dropped to 3200 tons against 7300 tons in April. Growing competition of American and Canadian makers is given as the reason for the decline in German business.

Production of Iron and Steel in Canada
(In Gross Tons)

Year	Pig Iron	Ferroalloys	Steel Ingots	Steel Castings
1923	880,018	28,961	839,710	45,060
1924	593,024	26,400	625,175	25,515
1925	570,397	25,709	733,855	18,840
1926	737,503	57,416	743,550	33,338
1927	709,697	56,514	867,928	39,710
1928*	468,013	26,014	625,493	22,845

*Figures for the first six months ended with June 30.

Miners' Action an Admission of Defeat

Abandonment of Jacksonville Scale So Regarded in Pittsburgh—Union Has Lost Much Ground

PITTSBURGH, July 24.—Important coal producing interests, including the steel companies which operate their own mines, view passively the decision by the wage scale committee of the United Mine Workers of America withdrawing the Jacksonville wage scale as the sole basis of negotiations for working agreements between operators and the union. The prevailing opinion among coal producers is that the decision amounts merely to "locking the stable door after the horse has been stolen."

Southern Ohio operators, not long after the suspension resulting from the inability of the producers and union leaders to get together when the Jacksonville scale terminated by limitation, attempted to open negotiations on much the same terms that now are acceptable to the union leaders. The offer was rejected almost without consideration. In the Pittsburgh district it was the stand taken by the miners' union officials rather than animosity toward the union that prevented a renewal of the agreements. The abandonment of the demand that proved to be the stumbling block in continuance of the operation of many mines in the district under signed contracts with the union is looked upon as an admission of defeat by the union.

A Serious Blow to the Union

Close students of the situation, however, regard it as something more serious for the union than merely the loss of the strike which started April 1, 1927, because they see no disposition on the part of the operators who formerly worked their mines on a union basis to respond to what amounts to an invitation by the union to resume negotiations. The Pittsburgh Coal Co. and the Pittsburgh Terminal Coal Co., the two largest commercial producers in the Pittsburgh district, have publicly stated that they have no intention of resuming relations with the union, while the industrial mines, which have been operating for more than a year on an open shop basis, also are unresponsive to this attempt to get them back under union domination. The operators of southern Ohio, likewise, are adamant.

The common condition at the time of the expiration of the Jacksonville scale was that, since the union insisted on the scale established in Jacksonville as a primary premise and the operators could not pay that scale and compete with the open shop mines, a conference on wages would be futile. The feeling now is that there is no occasion for a conference, as the open shop has been established and with it there has been set up an equality of wages in the different producing districts that has settled a very vexing problem for the national industry.

The coal industry could not exist half union and half non-union, since the half working union would have to pay higher labor charges than the half where the control of wages was in the hands of the employers, and the producers with the lowest labor costs naturally dominated the market, subject only to the limitation of freight charges to destinations. If the union had been successful in unionizing the open shop mines and had brought about a level scale of wages for all fields the story might have been different. Since it failed, it was only natural that the trend should be in the other direction and that union mine operators should place themselves in a position to meet the competition provided by the open shop producing districts. The union leaders took the position that, if they accepted lower wages for union miners, the non-union miners' wages would suffer correspondingly, and the situation would be as before, with a high scale in the union mines and a low one in the non-union operations.

Open Shop Miners Apparently Satisfied

Such reasoning did not recognize the changed attitude of employers toward employees that developed several years ago. It has long since ceased to be the fashion to get as much out of labor as possible for the least amount of money and more the vogue to pay wages that enable the workman to live and put something aside. There is no evidence that the coal miners who have been working on the open shop scale of wages in this district are dissatisfied. The wage scales are fair and between steady work and the saving of union dues and assessments the pay envelopes generally are stouter than they were when the men were working on part-time schedules.

In the last previous strike, in 1922, the union lost northern West Virginia as a unionized district. While there may be some tonnage mined in the Pittsburgh district under union auspices, the preponderance of the tonnage will be of non-union coal and to a large degree the union will have lost this district. It also has probably lost ground in Ohio, Indiana and Illinois.

An uneconomic policy is responsible for the position in which the union now finds itself. If the leaders had taken the same attitude as the railroad brotherhoods, the position of the union would have been stronger. Recognition more promptly of changing market and industrial conditions would have promoted sustained relationships with the producers. And the steady flow of funds into the union treasury, as a result of the check-off or the company collection of union dues and assessments, would have made the miners' union even more powerful financially than the railroad brotherhoods. The miners' union has lost much more than the strike that started 15 months ago.

E. Arthur Tutein, Inc., Asks Extension from Creditors

E. Arthur Tutein, Inc., Boston and New York pig iron merchant, has asked creditors for an extension of six months for a settlement of claims. Approximately 95 per cent of the creditors have consented to such an extension, pending the outcome of the company's suit against the Hudson Valley Coke & Products Corporation, and a counter suit against E. Arthur Tutein, Inc., by the Troy, N. Y., company, the result of the termination of a selling agreement.

What course E. Arthur Tutein, Inc., takes within the immediate future will depend on action to be taken this week by creditors at a special meeting. Mr. Tutein has offered to serve as president of the company without compensation during the liquidation of the assets now available.

On Friday, July 20, the New York Court of Appeals ruled that Charles M. Schwab had previously and still has the right to appoint the third arbitrator in the controversy between E. Arthur Tutein, Inc., and the Hudson Valley Coke & Products Corporation. It was contended by the Hudson Valley company, Mr. Schwab's authority in the matter had lapsed, because the arbitrator he appointed declined to serve. It is probable that the third arbitrator will be named shortly and that hearings will be begun.

Purchases Ashland Steel Co.

Purchase of the Ashland Steel Co., Ashland, Ky., by the American Rolling Mill Co. has been announced by George M. Verity, president of the latter company. The plant of the Ashland Steel Co. adjoins that of the Norton Iron Works Co., which was bought by the American Rolling Mill Co. early in 1927. The property was acquired from the First National Bank of Ashland, which took it over when the steel company failed two years ago. The purchase price has not been revealed, nor what disposition is to be made of the plant. The Ashland and Norton companies, although owned independently, were originally operated jointly, the Norton blast furnace supplying hot metal to the Ashland mills for the manufacture of steel rods and wire.

National Fuels Meeting in Cleveland

The second national fuels meeting will be held at the Cleveland Hotel, Cleveland, Sept. 17 to 20. The technical contributions will include the following, presented under the auspices of the Fuels Division of the American Society of Mechanical Engineers:

Constitution and classification of coal, and fuels and their flame characteristics with reference to combustion values and furnace-space requirements; direct firing of boilers with producer gas; Texas lignite as fuel for power-plant boilers, and washing and preparation of coal; relative values of solid, liquid and gaseous fuels; industrial furnace efficiency; collecting dust from chimney gases in powdered-fuel installations; unit system of coal pulverizers, and boiler-furnace refractories, and stoker advantages and difficulties.

Mystic Furnace Complains of Pig Iron Freight Rates

The Mystic Iron Works, Everett, Mass., has filed with the Interstate Commerce Commission a complaint against New England railroads, which is directed primarily against the New York, New Haven & Hartford, although the Boston & Albany, Boston & Maine, Maine Central, Rutland and Central Vermont roads are also named as defendants.

It is claimed that freight rates on pig iron from the blast furnace at Everett are excessive and discriminatory, and the commission is asked to compel the carriers to put into effect reasonable rates and to pay the Everett company as reparation the difference between freight charges actually paid in the past and such rates as may be found reasonable, together with interest at the rate of 6 per cent.

It is the contention of the management that the Everett furnace was built with the assurance of the New York, New Haven & Hartford Railroad that freight rates would be reduced, and that in the absence of such assurance it would not have been built. The carrier, it is claimed, has not only failed to reduce rates on the Mystic product, but has established a rate of $2 per gross ton on competitive pig iron ex-barge from Albany and Beacon, N. Y., to New England points, which is lower than rates paid by the Everett company.

Furthermore, it is contended that these ex-barge rates are unduly preferential to the company's competitors located at Buffalo and other New York State points, giving Buffalo furnaces an additional competitive advantage of $1.13 a ton. The New York, New Haven & Hartford Railroad's $2 rate from Beacon, N. Y., blankets its system as far east as the Phillipsdale, R. I.-Worcester, Mass., line. The complainant maintains that carrier's pig iron rates are high as compared with those asked by the New York Central Railroad, and makes the following comparisons:

	N. Y., N. H. & H. Rates				N. Y. C.	
	Boston		Beacon, N. Y.		Buffalo	
Miles	Ton Mile	Car Mile	Ton Mile	Car Mile	Ton Mile	Car Mile
40...	5.0c.	$2.55	...	...	3.5c.	$1.79
70...	3.5	1.79	2.81c.	$1.43	2.0	1.02
100...	2.5	1.28	2.00	1.62	1.75	.89
135...	2.4	1.22	1.48	.755	1.4	.714
180...	1.95	1.00	1.11	.577	1.1	.561
215...	1.7	.867	...	...	0.9	.459

Freight rates on competitive irons, despite the $2 water freight rate, are not against the Mystic Iron Works in all instances. To illustrate this point, the following rates per ton are given for comparison, those from New York State being figured on the $2 water freight rate:

	From		
To:	Everett	Buffalo	Port Henry
Providence, R. I....	*$2.00	$3.78	$3.65
New Britain, Conn..	*2.90	3.78	3.65
Springfield, Mass....	2.27	3.78	3.00
Worcester, Mass....	1.89	3.78	3.15
Hartford, Conn.....	*2.90	3.78	3.65
New Haven, Conn..	*3.20	3.78	3.28

*Plus a $5 per car transfer charge.

Steel Roof Reduces Hazards in Washington Fire Test

In a recent fire test conducted in Washington by the United States Bureau of Standards to determine primarily the fire-resistant qualities of various types of steel safes, a collateral test was made of a steel roof as a means of reducing hazards due to flying embers and sparks. The old building used by the Bureau of Standards for the fire test was covered with a material of such composition that it would readily catch fire from the heat generated by the burning of dry lumber purposely piled on floors below. The bureau invited the Sheet Steel Trade Extension Committee to cooperate in the test by placing a steel roof over the old roof. Double standing seam galvanized steel roofing was used.

Following the test the Bureau of Standards made the following observations regarding the roof:

"The framing carrying the elevator penthouse at the front of the building fell at 22 min. after the fire was started, carrying a portion of the roof with it. Further collapse of roof supports in this part of the building occurred during the next 5 min., leaving the front part of the metal roof unsupported. By 28 min. portions of the front wall fell and between 36 and 39 min. there was a collapse of the upper portions of the side walls. This would, of course, remove all support for any roofing.

"However, particularly with masonry walled buildings, the danger from hot blasts and brands is largely over when this stage is reached. The period of protection by the metal roof during this particular fire extended up to 30 min. after the fire started, which represents a portion of the most intense period of the fire. The metal roof for the time undoubtedly helped to prevent a chimney effect, compelling the flames and hot gases to escape mainly through the front and rear of the building."

John A. Pierpoint, former president National Association of Sheet Metal Contractors, who laid the steel roof and who closely observed the fire test, said that the sheet steel roof continued to wave up and down, even though it was red hot from the heat below, and at the same time prevented all burning embers from going above the line of the roof. "As a fire blanket or retardant," said Mr. Pierpoint, "I feel that the sheet steel roof was a complete success. The test shows that the double locked cross seams and standing grooved seam will hold together until the metal gets to near the melting point."

British Welding Associations Reorganize

As the result of mutual conferences between committees from the British Acetylene and Welding Association and the Institution of Welding Engineers a plan of cooperation has been agreed upon whereby the former will act as a trade association only. Its name will be changed to "The British Acetylene Association" and its members restricted to firms and individuals trading in oxygen, acetylene, calcium carbide, or oxwelding equipment. The Institution of Welding Engineers is to maintain separate existence, and confine its attention to scientific and technical problems and to the promotion of welding in all its branches. Its membership is to be confined to individuals.

United Steel Works Plans Large Expansion

HAMBURG, GERMANY, July 6.—The United Steel Works of Germany has just issued details of its expansion program, which will cost 200 million marks. Improvements are to include a large open-hearth steel plant at Dortmund, modernization of plants at Mühlheim and construction of a new electric steel plant. Production of hoops and bands will be substantially increased. Two new blast furnaces of large capacity will be built and three furnaces, which were built in 1904, will be scrapped.

New Production Counter

A new counter for production machines, designated the "productimeter," has been brought out by the Durant Mfg. Co., Milwaukee. It is said to be particularly adapted to small drill presses, light-duty conveyors, printing presses and the like.

Among the new features are special bronze bushings to insure long wear. These require little oil and when worn can be replaced with new bushings. There is a new drive sleeve designed to prevent racing of the counter when operated at high speed.

More Than 2,200,000 Automobiles in First Half

Production of automobiles in the United States in June is reported by the Department of Commerce at 396,714 units, making a total for the first half of 2,201,880. This is the second largest production for any six months in the history of the United States. It was exceeded only by the first half of 1926, in which the total was 2,358,585 cars and trucks. It exceeded by 2½ per cent the 2,150,134 of the first half of 1925 and by more than 6½ per cent the 2,068,915 of the first half of 1927. The largest second half yet reported was in 1925, when the total was 2,115,570. No other second half has reached 2,000,000 cars.

Of the June total, passenger cars represented 356,439 and trucks 40,275. In May the year's maximum was reached, at 375,863 passenger cars and 50,233 trucks—a total of 426,096. Compared with 1927, June shows a larger gain in passenger cars, but a falling off in truck production. Passenger cars a year ago numbered 278,729 and trucks 43,238.

Comparing the two types of output for the first half-year, passenger cars this year at 1,965,727 showed an increase of 9 per cent over last year's 1,802,620. As to trucks, however, the output of 236,153 units this year was 11½ per cent below the 266,354 produced last year.

Commercial Aviation in Germany and England

According to a report on civil aviation issued by the English Government, by far the largest development in air transport has occurred in Germany, where the Deutsche Luft Hansa has 170 machines, 150 pilots, and 56 air engineers in active service. It operates over 70 routes in the summer and about half this number in the winter, and provides communication with most European countries, either alone or in conjunction with other concerns. In 1927 it carried 151,091 passengers, the mileage flown being 6,189,000. Another German firm operated a service between Berlin and Moscow, where a connection was made with the Junkers' service to Teheran. This concern carried 3700 passengers. The haulage of freight is rapidly becoming an important factor in German air transport.

In Great Britain, Imperial Airways, Ltd., concentrated its attention on the London to Zurich, London to Cologne and the Southampton-Guernsey routes. The mileage flown was 614,655 miles, compared with 840,000 miles in the previous year, though the passengers carried increased from 16,775 in 4777 flights to 18,874 in 4450 flights. The cargo carried fell from 679 tons to 593 tons. The British share of the foreign traffic fell from 61 per cent to 57 per cent., the total passengers carried on the cross-Channel services being 28,764. Traffic fell off much less during the winter months than during the previous year. This movement was assisted by the introduction of second-class fares. Efficiency is also increasing, the percentage completed of flights actually commenced being 99 per cent. The chief cause of interruption was bad weather. The regular air services were free from accident for three years.

The notable technical developments during 1927 have been, according to *Engineering*, the substitution of metal construction for that of wood and fabric, leading to greater safety, lower maintenance, and less weight. Much progress was made in the development of apparatus for controlling airplanes at low speeds, of which the most successful is that known as the automatic slot, and experiments were continued in connection with the silencing of aircraft and engines. The Napier-Lion water-cooled engine has proved successful. During the year 100-hp. De Haviland and the Avro "Alpha" engines were produced for use on light airplanes.

Continued Heavy Production of Steel Castings

Production of commercial steel castings in June is reported by the United States Department of Commerce at 90,202 net tons. While this is a reduction of 3 per cent from the 92,948 tons of May, it is the third largest monthly tonnage in more than a year. It compares with 87,767 tons in June, 1927, and represents 63 per cent of capacity compared with 64 per cent in May and 61 per cent a year ago. Of the June total, 30,742 tons was railroad specialties, representing 46 per cent of capacity for that type, while 59,460 tons or 77 per cent of capacity was miscellaneous castings.

Production for the first six months has reached 523,745 tons. This is 4½ per cent less than the 548,223 tons of last year. The reduction was felt by both groups, for railroad specialties at 204,841 tons were nearly 7 per cent below the 219,612 tons of last year, while miscellaneous castings at 318,904 tons recorded a drop of 3 per cent from the 328,611 tons of the first half of 1927.

New orders in June showed a sharp shrinkage from preceding months and represented the lowest total since last November. Bookings were only 70,762 tons, compared with 86,414 tons in May and with 90,898 tons in June, 1927. They represented 49 per cent of capacity against 60 per cent in May and 63 per cent a year ago. Railroad specialties recorded the greater portion of this drop. At 22,597 tons, or 34 per cent of capacity, they were 35 per cent lower than the May total of 34,995 tons, which was 52 per cent of capacity. They were still further below the figure of last year, when June showed 39,455 tons, or 59 per cent of capacity. Miscellaneous castings booked in June were 48,165 tons, or 63 per cent of capacity. This represents a drop of more than 6 per cent from the 51,419 tons of May and about the same amount from the 51,445 tons of June, 1927.

New bookings in the first six months were 505,947 tons, or 59 per cent of capacity. This is about 6 per cent lower than the 537,189 tons of the first six months of last year. Railroad specialties recorded the larger drop in the six months, the total having been 203,766 tons, or more than 11 per cent below the 230,176 tons of last year. Miscellaneous castings at 302,181 tons were less than 2 per cent down from the 307,013 tons of last year.

Reduction in Wholesale Prices of Commodities

Further reduction is reported by the United States Bureau of Labor Statistics in the general average of wholesale prices. The figure for June is given as 97.6, compared with 98.6 in May, on the weighted average of 550 series of prices based on 100 as the average of 1926.

Several of the 10 major groups showed decreases of about 3 per cent each, these being farming products, hides and leather products, and the miscellaneous group. Decreases of less than 1 per cent each were recorded by foods, textiles, chemicals and drugs and housefurnishing goods. Increases of a fraction of 1 per cent were reported for fuel and lighting, metals and metal products and building materials.

Metals and metal products at 98.7 compared with 98.6 in May and with 98.2 a year ago. There was a decrease in iron and steel from 94.8 to 94.2, but non-ferrous metals went up from 92 to 92.8. An increase is reported in automobiles from 104.7 to 105.1, while agricultural implements and other metal products remained practically unchanged.

Foundry Equipment Orders 49 Per Cent Above Average

Orders in June for foundry equipment are reported by the Foundry Equipment Manufacturers Association at 149.1, the base of 100 being average monthly shipments for 1922 to 1924. While the orders represent a sharp reduction from the preceding month, they were, with that exception, the greatest since February, 1927. Orders in May at 335.6 were the greatest ever recorded.

Shipments in June were 129.4, on the same base as orders. Unfilled orders at the end of the month represented 359.3, on the same base. This is close to three times the current monthly shipments.

The Service Steel Co., seamless and welded steel tubing, Detroit, is installing an office and warehouse at 216 North Alameda Street, Los Angeles, to supply seamless steel tubing in low carbon steel and in popular aircraft grades.

Pittsburgh River Shipments of Steel Double Those of 1927

The Ohio River movement of iron and steel products from the Pittsburgh district was smaller in June, the Pittsburgh office of United States Engineers Corps reports. The total was 96,156 net tons, which compares with 112,818 tons in May, and 110,356 tons in April. Shipments by the Ohio River measure accurately the delivery of iron and steel products at destinations sufficiently distant from the Pittsburgh district to effect a substantial saving in freight charges over all rail rates. In June, the Allegheny River was used in the movement of 2350 net tons of iron and steel products and on the Monongahela River, 75,422 tons were carried.

Figures for all three streams include some interplant shipments, and some waterborne deliveries to Pittsburgh district consumers, but essentially the Ohio River tonnages represent the movement to more distant destinations. For the six months ended June 30, the Ohio River tonnage amounted to 554,660 tons, as compared with 223,736 tons in the same period in 1927.

Machinery Exports in 1927

Industrial machinery exports of 1927, by principal classes of equipment, were roughly as follows: mining, oil-well and pumping machinery, $35,583,000; metal-working machinery, $25,379,000; construction and conveying machinery, $19,127,000; textile, sewing (industrial) and shoe machinery, $17,552,851; power-generating machinery, except electric and automotive, $17,551,000; other industrial machinery, $67,975,000.

American Industries by Geographical Sections

Study of the manufacturing output of the United States by major types of products and by geographical sections has been made by N. E. Peterson, industrial statistician of the First National Bank of Boston. The study apparently was undertaken largely because of persistent reports of the gradual decadence of New England as a manufacturing center.

The articles, which were published serially in the Boston *Herald*, have been put out in pamphlet form by the bank. Each is illustrated by graphic representation of the various quantities involved and the story is told, in each, of the changing character of the manufacturing output of each section of the country. The value of New England production is shown to have gained five-fold in a period of 45 years.

In the Middle Atlantic States, iron and steel in 1925 represented 8 per cent of the total manufactured output, with women's clothing in second position. In the North Central States, motor vehicles stand first, with iron and steel second, motor vehicle parts third, slaughtering and meat packing fourth, and foundry products fifth. In the East South Central States, iron and steel stand second, after lumber products. In the remaining sections of the country, however, it is a comparatively small factor. Smelting of copper leads in the Mountain States, while lumber products and petroleum refining are the two principal items on the Pacific Coast.

Exports Help Maintain High Automobile Production

Sales of American-made automobiles abroad have increased by 425 per cent during the last five years and a further important gain is taking place this year. As a result of this large expansion, foreign buying of motor cars now ranks third in the list of the country's exports, according to President J. R. Nutt, of the Union Trust Co., Cleveland.

"Expanding markets abroad offer the most favorable solution for the full employment of the country's growing automotive productive capacity," says Mr. Nutt. "Whether or not the saturation point is near in this country, there is a vast potential demand for cars among other peoples. Tariff barriers are directed especially against assembled cars, with the result that in 1928 probably over 200,000 cars made of American parts will be assembled in plants abroad. The rate of growth of motor car exports is seen in the fact that while five years ago exports totaled 78,000 units, in 1928 it is estimated that 450,000 cars and trucks will be shipped abroad.

"At the present capacity of the automobile industry, an output of approximately 4,000,000 cars annually is needed for reasonable prosperity. Replacement demand is about 2,500,000 cars annually in the United States and Canada. New buying this year is running at the rate of over 1,000,000 cars, so that the estimated exports of 450,000 will bring the total demand up to, or above, 4,000,000 cars."

Production in Italy

WASHINGTON, July 24.—Production of pig iron in Italy during the first three months of the current year totaled 83,800 metric tons as against 134,800 tons during the corresponding period of last year, while raw steel output showed a contrary course and increased to 404,400 tons as against 333,100 tons, according to a statement prepared by the Iron and Steel Division, Department of Commerce, based on reports received from Assistant Commercial Attaché A. A. Osborne, Rome.

Imports and exports declined during the 1928 quarter, being 197,400 tons and 2572 tons as against 237,672 tons and 4265 tons, respectively. Of the total of 104,928 tons of scrap imported into Italy in the first quarter of the present year, as against 132,664 tons for the corresponding period of last year, France supplied 70,668 tons while 11,828 tons came from Switzerland. The United States supplied only 377 tons.

Electrical Developments Increase Use of Copper

Generation and use of electricity in the United States now utilizes approximately three billion pounds of copper, according to the Copper and Brass Research Association in its July bulletin. This total does not include the use of copper for telephone and telegraph lines and for electrical manufactures shipped abroad.

The association bases its estimate on the fact that for every horsepower added to the nation's electric power rating since 1922 the electrical industry has taken about 84 lb. of copper for the generation, transmission and use of current. Electric light and power plants, both steam and water-power, in the United States at the beginning of 1928 had a total generating capacity of about 34,000,000 hp.

Hydroelectric power alone may some day utilize nearly seven billion pounds of copper, according to the association. It is pointed out that the hydroelectric power industry, with almost 12,300,000 hp., now represents about 36 per cent of the nation's generating capacity and has therefore already become an important user of copper.

Activities in New England

The Standard Screw Co., Hartford, Conn., reports production and new orders during the first half of 1928 as well ahead of the same period last year, with the outlook for the remainder of 1928 highly favorable.

The Indian Motocycle Co., Springfield, Mass., bookings and shipments in July will exceed those for the corresponding month last year. The company is developing a four-cylinder motor car with a 70-in. wheel base, similar to foreign types noted for economy of operation.

The Thompson Products, Inc., Hartford, Conn., plants are operating day and night. The company's automobile business is not only running at a new high record, but there has been a large growth in its airplane engine valve business this year, as well as in the valve replacement business. The company has written off $250,000 of machinery, replaced by labor saving devices.

Average weekly earnings in representative New York State factories are reported for May by the State Industrial Commissioner at $29.19. This represents a gain of 40c. over April, but it is 45c. lower than the earlier and is 11c. lower than the average in March. It is 1c. above the corresponding figure of a year earlier.

Warren Iron & Steel Co. to Be Sold at Auction

The entire assets of the Warren Iron & Steel Co., Warren, Ohio, manufacturer of alloy steels and agricultural implement disks, will be sold at public auction on Aug. 15, following order of the court and the bondholders' protective committee. The company has been employing about 1500 men, and sale will include land and buildings, rolling mills, fabricating equipment, and other machinery and equipment. The Industrial Plants Corporation, 25 Church Street, New York, is auctioneer.

New Distributing Company Organized

Taylor-Davis, Inc., 4250 Wissahickon Avenue, Philadelphia, has been formed by a consolidation of the A. Taylor Co. and the reinforcing bar division of Davis Brothers, Inc., both Philadelphia companies. The company will maintain a warehouse in Philadelphia and warehouse connections in Pittsburgh and New York as distributers for the Jones & Laughlin Steel Corporation's Junior beams and reinforcing steel, American Steel & Wire Co.'s welded fabric, Seneca Wire Mfg. Co.'s wire specialties and George W. Prentiss & Co.'s high carbon wire.

Officers of the new company are: Arthur P. Goldsmith, president; Edward L. Davis, treasurer; M. L. Fitzgerald, secretary. Herbert E. Calves is manager of reinforcing steel sales, Joseph H. Calby, manager of road reinforcing sales, and H. C. Ormerod, manager of wire and specialties sales.

Second Quarter Steel Earnings Up

The Republic Iron & Steel Co. reports net profits applicable to dividends in the second quarter of $1,053,855, equivalent to $1.03 a share on common stock. This is the first quarterly report to include the operating results of the Trumbull Steel Co., recently acquired by the Republic company. The showing of the quarter just passed is considerably better than net profits of $487,332 reported in the quarter ended March 31 and also a slight improvement over the $988,115 earned in the second quarter of 1927. Profits in the first half of 1927, however, amounting to $2,032,537, were more than 30 per cent higher than the 1928 earnings for the corresponding period, totaling $1,541,186. The company's unfilled orders, as of June 30, 1928, amounted to 324,315 tons, as compared with 170,671 tons on March 31.

The Central Alloy Steel Corporation's profits in the June quarter of this year totaled $1,265,230, as compared with $1,108,100 in the preceding quarter and with $1,244,670 in the corresponding quarter of 1927. Profits of this company during the first six months of 1928 totaled $2,373,330, as against $1,929,573.

The Otis Steel Co. had earnings of $907,436 in the second quarter of 1928, compared with $821,288 in the preceding quarter and with $435,512 in the June quarter last year. These figures are after depreciation, interest, etc., but before Federal taxes.

Earnings of the Gulf States Steel Co., at $203,953 in the quarter ended June 30, 1928, showed a decline from the $337,849 earned in the previous quarter, but an improvement over the $134,130 reported in the second quarter last year. Profits in the first half of 1928 totaled $541,802, as against $371,225 in the first six months of 1927.

The A. M. Byers Co. net profits amounted to $484,232 in the June, 1928, quarter; $335,249 in the March, 1928, period; $395,579 in the June, 1927, quarter, and $374,092 in the three months ended March 31, 1927.

Sheet & Tube Company Dismantling Blast Furnaces

The Youngstown Sheet & Tube Co. has partially dismantled one of its blast furnaces at South Chicago, and will soon begin tearing down the Tod furnace of the Brier Hill group in Youngstown. As mentioned in THE IRON AGE last week the by-product coke works at Mayville, Wis., are to be scrapped, but it is not the company's intention to tear down the blast furnaces of the Mayville Iron Co. at that place. When these furnaces are operated coke will be secured from nearby producers.

This will leave the Sheet & Tube company with eight furnaces in the Youngstown district, four at the Campbell works, two at Hubbard and two at Brier Hill. In the Chicago district three furnaces will remain at the South Chicago Works and two at Indiana Harbor. With the two Mayville furnaces the company will have fifteen possibly active blast furnace units.

Dr. Hatfield to Be Next Campbell Lecturer

Dr. W. H. Hatfield, who is director of the Brown-Firth Research Laboratories, Sheffield, England, will deliver the Campbell memorial lecture during the annual convention of the American Society for Steel Treating to be held in Philadelphia the week of Oct. 8 concurrently with the National Metal Exposition. The subject of Dr. Hatfield's paper will be "The Application of Science to the Steel Industry." He will deal with such topics as steel making problems, manipulation and treatment, special steels, corrosion and acid resisting steels, effect of heat and heat resisting steels and tool steels and cutlery.

Dr. Hatfield is recognized as one of the world's leading metallurgists and has been actively engaged in the steel industry since his graduation from Sheffield University. He has presented over fifty papers before various technical societies as well as being the author of several books on metallurgical subjects. He has been invited to lecture at a number of American institutions after the Philadelphia convention, among which are Yale University, Massachusetts Institute of Technology, Carnegie Institute of Technology, and the University of Michigan. Dr. Hatfield's lecture will be the third since the establishment of the Campbell Memorial Lecture by the A.S.S.T. in honor of its late founder member. The first lecture was presented by Dr. Guertler of Germany, the second by Dr. Jeffries.

Aberdeen Munitions Demonstration Oct. 4

The tenth annual meeting of the Army Ordnance Association will be held at the Aberdeen Proving Ground, Maryland, Thursday, Oct. 4. With the approval of the Secretary of War and the cooperation of the various branches of the Army, guests at the meeting are permitted to witness current tests of modern munitions. The American Society of Mechanical Engineers is cooperating this year.

The program of demonstrations, beginning at 10 a. m., lasts throughout the day and concludes with anti-aircraft firings in early evening.

September Machine-Shop Practice Meeting

The Machine Shop Practice Division of the American Society of Mechanical Engineers is to have its next national meeting in Cincinnati on Sept. 24, 25 and 26, and in connection with this meeting the Cincinnati committee is planning a trip to Ashland, Ky., to visit the new continuous sheet mill of the American Rolling Mill Co. The group will leave Cincinnati by river steamer on Monday afternoon, Sept. 24, and will arrive at Ashland Tuesday morning, where they will spend the day at the mill as guests of the company. They will leave Ashland some time Tuesday evening and be back in Cincinnati Wednesday morning. On Monday and Tuesday evenings there will be technical sessions aboard the steamer. A third session held in Cincinnati will be a symposium on machine tools.

The total cost of the trip including meals and state room will be about $20. From the nature of the trip it will not be possible to include ladies, but there will be room for men guests who are not members of the society.

Navy Asks Bids for Steel

WASHINGTON, July 24.—The Bureau of Supplies and Accounts of the Navy Department will open bids on July 31 for approximately 200 tons of angles. On Aug. 7 the bureau will open bids for approximately 500 tons of galvanized sheets, 75 tons of black sheets and 50 tons of plates. The material is for various navy yards and air stations.

Reduction in Fabricated Steel Plate Orders

New orders for fabricated steel plate in June are reported by the Department of Commerce at 34,278 net tons, or 42.9 per cent of the capacity of the 51 firms reporting. This shows a drop of about 19 per cent below the 42,376 tons reported for May, but is 19 per cent above the orders for June, 1927, which were 28,811 tons. The recent total is the smallest, except for last November, since a year ago. For the half-year the total has been 259,448 tons, which is 2 per cent below last year's 264,945 tons.

Of the June total 11,280 tons (smallest since January) was for oil storage tanks; 2227 tons (larger than May, but otherwise smallest since December) for refinery materials and equipment; 965 tons (smallest, except February, since last July) for tank cars; 3225 tons (smallest since March) for gas holders; 778 tons for blast furnaces and 15,803 tons for stacks and miscellaneous. Compared with 1927, the half-year shows a gain of 2345 tons in orders for oil tanks and 2589 tons for refinery materials, but a decline of nearly 7500 tons on tank cars and 4550 tons on gas holders.

Makes Acid-Resisting Refractory Brick

A new refractory brick has been developed by the General Refractories Co., Philadelphia, which is highly resistant to acid attack. It has been given the name Acido. It is intended particularly for use in copper, zinc and lead plants, sulphide paper plants, fertilizer works, etc. It is made from a clay specially selected for acid resistance.

Safety Congress in New York in October

The National Safety Council is planning to hold its seventeenth annual safety Congress in New York from Oct. 1 to 5.

European Steel Entente Modifies Fines

WASHINGTON, July 24.—It has been officially confirmed that the Continental Steel Entente has modified its original system of fines for overproduction so that now a fine of $1 per metric ton will be levied upon each ton of raw steel produced in excess of the specified quota of each individual country up to a tonnage amounting to 7.5 per cent of the allotted quota, says a radiogram received by the Iron and Steel Division, Department of Commerce, from Acting Commercial Attaché Daniel J. Reagan, Paris. From 7.5 per cent up to 10 per cent this fine becomes $2 per ton and for all tonnages produced in excess of 10 per cent above the allotted quota, the old fine of $4 is to remain in force. Should this revision be retroactive to Jan. 1, 1928, the fines assessed against the German industry will amount to $4,000,000 over the first five months of the year, an amount three times that actually paid by this industry. This situation is compensated for, however, by an increase made in the German quota of from 275,000 tons to 300,000 tons monthly.

Malleable Castings Business Off in June

WASHINGTON, July 24.—Showing a decrease of 2321 tons, orders for malleable castings in June amounted to 52,108 tons, against 54,429 tons in May, according to reports received from 133 identical manufacturers by the Department of Commerce. Production in June totaled 61,230 tons, or 64.6 per cent of the reported monthly capacity of 94,719 tons, against 61,458 tons, or 67.3 per cent of the reported monthly capacity of 91,296 tons in May. Shipments in June totaled 59,482 tons, against 58,264 tons in May.

For the first six months orders totaled 328,938 tons, compared with 314,616 tons for the corresponding period last year. Production amounted to 356,753 tons and shipments to 339,558 tons, against production last year of 351,096 tons and shipments of 342,097 tons.

Report on Mechanization of Industry

Economic and social progress in connection with the mechanization of industry are covered in the twelfth annual report of Magnus Alexander, president National Industrial Conference Board, New York. This forms a volume of 60 pages, of which the topic mentioned covers 18 pages. Part II details the Conference Board's contribution during the year to industrial economic knowledge, along a wide variety of topics. Part III describes the board's organization and method of operation, while part IV lists the officers, members and counsellors and the affiliated organizations and committees.

Treasury Upholds Small Shapes Decision

The request of steel importers that the United States Treasury Department, customs division, reverse its decision of June 2, changing the classification of bar size channels, angles and tees from paragraph 312 covering structural material to paragraph 304, which relates to bars, has been declined by the department. It is expected that the importers will now appeal to the Customs Court of Appeals.

The decision pointed out, as reported in THE IRON AGE, June 21, page 1762, that investigation showed that angles, channels and tees in sizes less than 3 in. are distinguished in the trade from the larger sizes of the said articles and that the smaller sizes are known as angle bars or angles, bar size; as channel bars or channels, bar size; and as tee bars or tees, bar size. Classified under the bar paragraph of the tariff act this material is subject to a duty of 0.3c. per lb. instead of 0.2c. per lb., the duty under paragraph 312.

The increased duty on much of the material affected by this reclassification, however, is more than 10c. per 100 lb. as a sizable tonnage of furring channels has been coming into the United States, and as these are valued at more than 1.50c. per lb. they are subject to a duty of 0.5c. per lb. or 50c. per 100 lb., whereas under the former classification in paragraph 312, there was no increase in the duty because of higher valuation.

Variable Conditions Noted in General Industry

Industrial activity, as measured by electrical consumption, is reported by *Electrical World* as indicating a spotty situation. Reports are based on returns from about 3000 large manufacturers scattered throughout the country. Industrial operations for the country are estimated for the first half year at about 2.8 per cent above that of a year ago. June showed a drop of 2.2 per cent from May, which is less reduction than usual. The month closed on a rate of operation about 3½ per cent above that of a year earlier.

Steel Earnings Show Improvement

The Jones & Laughlin Steel Corporation, with net profits of $4,241,091 in the quarter just passed, made a better showing than in any three-month period since 1926. In the March, 1928, quarter the company's profits were $2,903,457 and in the June, 1927, quarter, they were $3,576,079. First half earnings this year were $7,144,548, as compared with $7,234,803 last year.

The Youngstown Sheet & Tube Co. also reports increased profits, the figure for the three months ended June 30 having been $2,491,891, as against $1,663,516 in the preceding quarter and $2,062,215 in the June quarter last year. Sheet & Tube's first half profits totaled $4,155,407 as compared with $4,318,258 in the first six months of 1927.

Second quarter earnings of the Donner Steel Co., Inc., amounted to $307,345 this year and to only $161,472 in 1927. The company's net for the first half of 1928 totaled $391,218, as against $229,733 last year.

The Superior Steel Corporation showed a profit for the first time since 1926, its net amounting to $30,760 in the June quarter. Net loss in the preceding quarter was $63,117 and $46,000 in the second quarter of 1927.

Reinforcing Steel

Illinois Road Work Will Take 2500 Tons—Awards 5400 Tons

WITH 2500 tons needed for road work in Illinois and 1000 tons for similar purposes in Arkansas, new projects reported in the last week will require about 5900 tons. The following awards, totaling about 5400 tons, include no sizable jobs except a municipal reservoir at Portsmouth, Ohio, taking 1000 tons:

WESTCHESTER, COUNTY, N. Y., 150 tons, road work, to Truscon Steel Co.

NEW YORK, 700 tons, section of subway; from Rodgers & Hagerty, Inc., general contractor, to Day & Goater, Inc.

MONMOUTH COUNTY, N. J., 100 tons, road work, to Truscon Steel Co.

PORTSMOUTH, OHIO, 1000 tons, municipal reservoir, to West Virginia Rail Co.

DALLAS, TEX., 100 tons, warehouse for Crane Co., to Laclede Steel Co.

SPRINGFIELD, ILL., 250 tons, Illinois Highway Commission road work, to Laclede Steel Co.

CHICAGO, 500 tons, plant building, Miehle Printing Press & Mfg. Co., to Joseph T. Ryerson & Son.

CHICAGO, 275 tons, building for B. A. Eckhart Milling Co., to Barton Spider-Web System, Inc.

CHICAGO, 150 tons, apartment building, 5511 West Washington Boulevard, to Concrete Engineering Co.

MAYWOOD, ILL., 100 tons, two public schools, to Concrete Engineering Co.

ST. LOUIS, 300 tons, fruit commission house for Wabash Railway, to Laclede Steel Co.

ST. LOUIS, 450 tons; Mercantile building at Eighteenth Street and Washington Avenue, 350 tons, and factory building for Waxite Paper Co., Newstead and Hunt Avenues, 100 tons, to Missouri Rolling Mills Corporation.

CHICAGO, 100 tons, Forty-third Street viaduct, to Jones & Laughlin Steel Corporation.

CHICAGO, 180 tons, public school, Morgan and 105th Streets, to Barton Spider-Web System, Inc.

SACRAMENTO, CAL., 400 tons, paving in Ventura County, to unnamed interest.

OAKLAND, CAL., 170 tons, school administration building, to Pacific Coast Steel Co.

OAKLAND, 100 tons, automobile building, Twenty-ninth Street and Broadway, to Gunn, Carle & Co.

LOS ANGELES, 250 tons, apartment building, Rossmore and Rosewood Streets, to unnamed interest.

OLYMPIA, WASH., 100 tons, highway work, to Northwest Steel Rolling Mills.

SEATTLE, 350 tons, hotel, Fifth Avenue and Virginia Street, to Northwest Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

PROVIDENCE, R. I., 500 tons, produce terminal for New York, New Haven & Hartford Railroad.

WHITE PLAINS, N. Y., 500 tons, high school; bids July 25.

PITTSBURGH, 150 tons, McSorley Garage, to Carlem Engineering Co.

CINCINNATI, 300 tons, Walnut Garage.

CHICAGO, 500 tons, caissons for Mercantile Mart; general contract placed with John Griffiths & Son Co.

LITTLE ROCK, ARK., 750 to 1000 tons, road work for Arkansas Highway Commission.

SPRINGFIELD, ILL., 2500 tons, road work for Illinois Highway Commission.

SAN FRANCISCO, 114 tons, bakery, Alameda and Bryant Streets; bids being taken.

EVERETT, WASH., 300 tons, Rambaugh store; bids being taken.

Data Sheets for Motor-Truck Fleet Operators

To afford motor vehicle fleet operators a means for quickly checking changes made by manufacturers in the models of vehicles they operate, and for correctly ordering replacement parts, a standardized mechanical data sheet is proposed by J. F. Winchester of the Society of Automotive Engineers. This sheet lists all parts of the chassis, the body, and the equipment, and provides spaces for filling in such data regarding them as make, model, type, part number, serial number, size and the like.

Widespread use of this standardized sheet by leading motor truck and motor coach manufacturers, and the distribution of the data among service stations and fleet operators, would be an important factor in the more economical operation of such vehicles, by eliminating unnecessary delays for parts replacements and assuring more constant service from the vehicles. The proposed data-sheet form was printed in the July issue of *S.A.E. Journal*.

Adoption of such a form would involve practically no expense for any individual, according to Mr. Winchester. If the manufacturer adopts it in the right spirit, it can be used as a final inspection sheet and factory record, and can be coordinated with the factory instruction book supplied with the vehicle. This would simplify ordering of parts after a vehicle has become several years old, and would provide reliable reference records for the organization in furnishing parts for any model.

Railroads Cut Operating Expenses

Passenger business on the railroads in the first half of 1928 was the smallest in 18 years, according to *Railway Age*. Freight business was the smallest since 1925. In consequence, total earnings were the smallest since 1925.

The average wage paid per employee was the largest since 1921. In spite of this, total operating expenses were the smallest since 1922. There are numerous reasons why operating expenses were the smallest in six years. An important one is the decline in traffic. To this has been partly due the reduction in employees to the smallest number since 1922. This reduction more than offset the effect of the advance in the average wage, and, in consequence, the total amount of wages paid was the smallest since 1922.

Economy of operation has been increased in many ways, in spite of improvements which have been effected in service. The average number of tons of freight loaded in each car was the smallest since before the war. Nevertheless, the amount of service rendered hourly by the average freight train was the greatest in history. This was because the number of cars handled in the average freight train was the largest ever reached and the average speed with which freight trains were moved was the greatest ever recorded.

Poland Importing British Scrap

LONDON, ENGLAND, July 13.—Britain's maintenance of an export trade with Poland in iron and steel scrap for remelting is one of the outstanding features of the scrap market. During recent months substantial quantities have been sent from Yorkshire, and the significance of the movement is reflected in the course of prices whenever there is a fair domestic demand. One reason given for Poland's scrap purchases is that the practical side of the rehabilitated steel industry of that country is largely in the hands of men trained in British steelworks. A large contingent of Sheffield steel smelters is there. According to scrap merchants, the material they sell is now used in the big open-hearth plants, 60 per cent, and even more in some cases, being the proportion of the charge of a 60-ton furnace.

Less Shipping Under Construction

Total merchant shipping being constructed throughout the world represents 2,660,462 gross register tons, according to a statement of Lloyd's Register of Shipping. This is a reduction of 8 per cent from the March 31 figure of 2,893,251 tons. The reduction was accounted for by a shrinkage of 238,000 tons in British yards. The United States showed only 55,502 tons on June 30, compared with 56,049 tons three months earlier.

New York and Texas accounted for practically 30 per cent of the exports of the United States in 1927, according to the Department of Commerce. Totals were $770 and $647 millions for the two States, and $4,759 millions for the nation. The figures relate, as nearly as may be, to origin of the goods and not merely to exporting points.

Fabricated Structural Steel

New York Newspaper Building Takes 13,000 Tons—Awards Total 33,000 Tons

AWARDS during the last week amounted to 33,000 tons, but included no outstanding jobs except a building in New York for the *Daily News*, requiring 13,000 tons. Among the new projects, totaling 28,300 tons, are 7000 tons for junior high schools at Chicago, 5000 tons for 12 oil storage tanks in Texas and 4500 tons for a college building at Pittsburgh. Awards follow:

PORTLAND, ME., 780 tons, theater and office building, to Lehigh Structural Steel Co.

NORTHFIELD, VT., 250 tons, Norwich University armory, to McClintic-Marshall Co.

LAWRENCE, MASS., 150 tons, Champion International Co. power house, to New England Structural Co.

WEYMOUTH, MASS., 750 tons, power house addition, to New England Structural Co.

NEW YORK, 13,000 tons, *Daily News* Building on East Forty-second Street, to Harris Structural Steel Co.

NEW YORK, 6000 tons, several apartment buildings for Julius Tishman & Sons, Inc., to Hay Foundry & Iron Works.

NEW YORK, 1200 tons, office building for Lee, Higginson & Co., at 49 Broad Street, to Taylor-Fichter Steel Construction Co.

BROOKLYN, 700 tons, addition to department store of Thalheimer Brothers, to Richmond Structural Steel Co.

WILKES-BARRE, PA., 1000 tons, building for Wilkes-Barre Savings Bank, to Anthracite Bridge Co.

NEW YORK CENTRAL RAILROAD, 300 tons, bridge at South Bend, Ind., to McClintic-Marshall Co.

PENNSYLVANIA RAILROAD, 200 tons, three plate girder spans in Indiana, to American Bridge Co.

CLEVELAND, 650 tons; 500 tons for extension to soaking pit building and 150 tons for shear building for Otis Steel Co., to Wellman-Seaver-Morgan Co.

HOCKING VALLEY RAILROAD, 450 tons, bridges in Ohio, to American Bridge Co.

ASHLAND, KY., 275 tons, warehouse for American Rolling Mill Co., to Jones & Laughlin Steel Corporation.

TUSCALOOSA, ALA., 510 tons, power house for Gulf States Paper Corporation, to Ingalls Iron Works Co.

NEW ORLEANS, 236 tons, two barges for United States Engineers Corps, to Howard Shipyard & Dry Dock Co., Jeffersonville, Ind.

WATSEKA, ILL., 200 tons, bridge span for Chicago & Eastern Illinois, to American Bridge Co.

OGLESBY, ILL., 300 tons, waste heat house for Marquette Portland Cement Co., to Worden-Allen Co.

CHICAGO HEIGHTS, ILL., 300 tons, mill building for Calumet Steel Co., to Worden-Allen Co.

BURR OAK, ILL., 418 tons, car repair shop for Chicago, Rock Island & Pacific, to American Bridge Co.

ROCK COUNTY, WIS., 300 tons, State bridge, to Continental Bridge Co.

KOHLER, WIS., 200 tons, supplementing 500 tons, pottery kiln for Kohler Co., to Worden-Allen Co.

MILWAUKEE, 2500 tons, addition to welded pipe shop of A. O. Smith Corporation, to Wisconsin Bridge & Iron Co.

WAUKESHA, WIS., 300 tons, addition for Waukesha Motor Co., to Wisconsin Bridge & Iron Co.

ST. LOUIS, 350 tons, fruit commission house for Wabash Railway, to Mississippi Valley Structural Steel Co.

OMAHA, NEB., 700 tons, addition to Union Pacific building, to American Bridge Co.

TACOMA, WASH., 400 tons, addition to salt and chemical works, to Star Iron & Steel Co.

OAKLAND, CAL., 170 tons, bridge over Alameda Creek, to Herrick Iron Works.

OAKLAND, 180 tons, automobile building, Twenty-ninth Street and Broadway, to California Steel Co.

SAN DIEGO, CAL., 253 tons, bridge over Sweetwater River, to Robert T. Dawson, San Diego.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PROVIDENCE, R. I., 500 tons, produce terminal.

BOSTON, 200 tons, Simmons College administration building.

BOSTON, 150 tons, Lafayette Theater on Tremont Street.

NEW YORK, 2500 tons, Seward Park High School on Ludlow Street.

KEARNY, N. J., 700 tons, factory building for Western Electric Co., Inc.

STATE OF NEW JERSEY, 250 tons, highway bridge.

PHILADELPHIA, 590 tons, highway bridges for city; Sixth Street and Alleghany Avenue, 375 tons; Ashdale Street, 100 tons; Leverington Avenue, 115 tons, bids opened July 25.

PENNSYLVANIA RAILROAD, 200 tons, bridges.

BALTIMORE, 500 tons, highway bridge for Maryland State Highway Department.

PITTSBURGH, 4500 tons, Cathedral of Learning, University of Pittsburgh.

ALTOONA, PA., 1000 tons, high school; bids taken.

DETROIT, 150 tons, plant addition for Thompson Products, Inc.

CLEVELAND, 150 tons, plant addition for Eaton Axle & Spring Co.

CLEVELAND, 130 tons, plant addition for Willard Storage Battery Co.

NEWARK, OHIO, 150 tons, Pennsylvania freight station.

STATE OF TEXAS, 5000 tons, 12 80,000-bbl. oil storage tanks for Texas & Pacific Oil Co.

STATE OF LOUISIANA, 2815 tons, two bridges.

MARSEILLES, ILL., 600 tons, highway bridges.

CHICAGO, 7000 tons, junior high school buildings.

EDGERTON, WIS., 150 tons, Newville bridge over Rock River; general contract let to P. J. Dunlap, Mount Horeb, Wis.

GREAT FALLS, MONT., 450 tons, high school building.

OAKLAND, CAL., 250 tons, hangar No. 4 for Port Commission; bids taken July 23.

GLENDALE, CAL., 400 tons, bridge over Los Angeles River; bids soon by Pacific Electric Railway Co.

OLYMPIA, WASH., 119 tons, bridge over Cle Elum River; general contract awarded to R. A. Geary, Yakima, Wash.

Plant Operation Averages 96 Per Cent of Full Time

Part-time operation of manufacturing plants has been studied by the National Industrial Conference Board, New York. The latest figures are for May, but as the change has been slight over the past 18 or 20 months they may be substantially accurate today. At that time about 78 per cent of the plants were operating on full time and 21 per cent on part time, the remainder being idle. Average operation of the part-time plants was at 81 per cent of full time, indicating that many of this group of plants must have been shut down more than one day each week. Percentage of full-time operation, averaged for all plants, was 96.

July Automobile Sales Unusually Large

Retail buying of automobiles holds at a point very considerably above the normal movement for this season, according to *Automotive Industries*, and gives indication of making the present summer the most active in recent years. Though the new cars are the center of interest, there continues to be good selling in earlier cars. Low-priced cars in particular show only seasonal reduction from earlier in the year.

Maintenance of price as reflected in the new car offerings gives indication of the strength of car demand, and the intention of manufacturers to base sales effort upon improvements and refinements. Some of the largest gains in the first half of the year were scored by companies whose cars were priced to permit including special engineering and refinement features.

July output of United States factories will be considerably under the June total of 396,714, not so much because of let-up in sales as to allow inventory at many leading factories. This will aid further in bringing dealer stocks, already at a low seasonal level, to a point warranting extensive manufacturing operations through the rest of the summer.

Fewer Cars in Need of Repair

Freight cars in need of repair on July 1 totaled 145,210, or 6.5 per cent of the number on line, according to reports just filed by the carriers with the Car Service Division of the American Railway Association. This was a decrease of 2780 under the number reported on June 15, at which time there were 147,990, or 6.6 per cent.

Freight cars in need of heavy repairs on July 1 totaled 107,265, or 4.8 per cent, a decrease of 183 compared with June 15, while freight cars in need of light repairs totaled 37,945, or 1.7 per cent, a decrease of 2597 compared with June 15.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Selling Copper in Europe

OUR British contemporaries have been having a good deal to say about what they consider to be a control of copper by the American Export Association that is unfavorable to the British manufacturers. Yet all that the American producers have done—and in this they have had the cooperation of the principal foreign producers—is to focus the copper market in New York and eradicate some trade evils, especially outside speculation.

The objectives have been to establish direct distribution of copper from producers to consumers, to eliminate speculative intermediation, and to extinguish competition among the producers in the foreign trade. The existence of large stocks of crude copper in Great Britain was formerly the basis for active trading on the London Metal Exchange and a speculative market was created that had its repercussions, commonly disliked, upon New York. American refiners have absorbed nearly all of that copper during the last year or two, fetching it hither for refining (copper refining in Great Britain having become a lost art). Consequently there is no respectable basis for buying and selling warrants in London and quotations from its exchange have ceased to be of influence.

In Europe the copper business has now been put upon the same terms as have prevailed for decades in the United States, i. e., a direct distribution from producers to consumers, with exclusion of the group of middlemen who formerly got their living out of the industry. The excluded group is naturally resentful, just as once it was in New York, and some consumers are doubtless vexed over the curtailment of their ability to play the market, which they ought not to want to do, anyway. Their complaint of being rationed in their supplies is obviously frivolous, for of course producers want to sell all the copper they can. Naturally there may be bilateral ideas as to price.

It is a soundly economic situation, even if it be not of the nature of *laissez faire;* and it cannot be otherwise, lest producers at least would become involved in difficulties such as resulted from the Secretan corner and the Amalgamated umbrella, which are still vividly remembered, although they happened long ago. During the last two years the world's consumption of copper has been increasing and in consequence there has been this year a very moderate increase of price. The situation and the prospects are kept constantly illuminated by the admirable statistics that are available.

The price of copper in Europe is the New York price plus freight and expenses. There is occasionally a slight differential in the published quotations that is misunderstood abroad. In periods of slack buying those smelters who take in ore on quotations may have to shade the price in the domestic market in order to dispose of the supplies they are constrained to accept, while the producers from their own mines continue to hold at a previous price, biding the time of advent of customers. In such a situation the Export Association now presents a united front. Although the shaded price is then a true market quotation, it is not a discrimination against the European buyer, for if the latter wanted copper in any quantity there would not be any shaded price. Likewise as to American buyers in the aggregate.

Two Superstitions Ruined

BANG! Bang! There go two pet beliefs, all in one day, ruthlessly slain by cold-blooded scientists. The remains will be regretfully interred alongside all that is mortal of such other defunct items as beta iron, solid atoms and a pancake-like earth.

We had always thought that type metal was type metal principally because it expanded on solidification and hence filled the mold sharply. But some Japanese with an iconoclastic bent has actually measured the volume of several alloys which printers use, and he finds that they contract during freezing!

Another statement, made by some forgotten writer, has been repeated so often that it is almost heresy to question it; namely, that the temperature of the oxy-acetylene flame is 6300 degrees Fahrenheit. This "fact" and the melting points of the common metals are always placed before welders as essential scientific data for the workman. Now some inquiring German expert in optical pyrometry announces that the maximum temperature he was able to measure was 3100 degrees Centigrade.

"What's a few hundred degrees, more or less, among fiends?" one might ask, without receiving any answer other than that it is well that an attempt has been made to measure the temperature with scientific equipment. The 6300 figure probably came from a class-room exercise in metallurgical calculations: given the specific heats, the heats of formation, and the chemical equation, to calculate the maximum flame temperature. The obvious error in such computations is the implicit assumption that data collected at moderate temperatures remain correct at intensely high heats.

That type-metal matter is not so simple. Gulliver's "Metallic Alloys," a standard text, says "Lead-antimony alloys are used in type metal, an alloy which . . . should expand on solidifying so as to take the finest design on the mold." Other books on metals and alloys make similar statements. Vickers in his "Metals and Their Alloys" apparently comes nearer the facts when he says: "Lead-antimony alloys containing less than 22 per cent of antimony contract on cooling; only richer

mixtures reproduce the finest impressions of the mold." He then quotes a number of standard type-metal compositions. The highest contains 18 per cent antimony. Looking back in a curious book dated 1869 and entitled "The Useful Metals" we find that bismuth (a metal which undoubtedly expands on solidification) was then used as a constituent of "letter type." Stereotype metal of that day was said to be composed of "3 lead, 2 tin, and 5 bismuth," but the various type metals quoted range from 9 lead 1 antimony to 3 lead 1 antimony.

Perhaps the statement that type metals expand on cooling is a relic of bygone days when some bismuth or high-antimony alloys were used which really did expand slightly on freezing. At any rate it is one of those statements which have been repeated, uncritically, because some former authority said so and so, and despite the fact that passing years may have entirely altered the circumstances for which the original statement was true.

Strip and Sheet Competition

A YEAR and a half back the sheet mills were a good deal concerned over the prospect of competition by strip mills. The sheet mills feared that large inroads upon their trade would be attempted. Apparently they had greater expectations than strip producers themselves as to what could be accomplished within a short time in the manufacture of a large tonnage of wide strips of relatively light gages. At any rate there has not been anything like as large increase as was expected. Comparing 1926 and 1927 there was a decrease of only 258,442 tons in sheet production, with an increase of 96,330 tons in strip production, a net change of 354,772 tons, which was only 6.5 per cent of the combined sheet and strip production of 1926, 5,459,568 tons. (Sheets 4,237,479 tons, strips 1,222,089 tons).

It would not be safe, moreover, to assume that this change involved a swing by consumers adopting strips in place of sheets for identical use, for when we compare 1925 and 1927 we find only 117,795 tons decrease in sheets and 69,784 tons increase in strips, the change of 187,579 tons being but 3.5 per cent of the combined production, certainly a small swing in two years. Also we have the fact that in the first half of this year independent sheet mills reported 10 per cent greater production than in the first half of last year.

It was feared that strips would be competitive in the market with sheets over quite a range of gages and widths. Such a situation has not developed. Prices show that the strip market has more competition within itself than it has with the sheet market, for a large tonnage of strips is being sold at prices far below figures that sheet mills would think of naming.

It is simply a case of the products being quite different. There is not anything like the similarity between them that many sheet mills feared a year and a half ago would develop before the present time. But that is not strange. Strips are wide hoops. Bands (12 gage and heavier) and hoops (13 gage and lighter) were produced in large quantity long before the word "strip" entered into trade usage. But there is no official definition indicating where bands and hoops stop and strips begin.

It will help one to get his bearings to refer to the production statistics of 1905, when after a lapse of years sheet production statistics were gathered, though only of 13 gage and lighter. Such production was 1,491,024 tons, while in the same year, 1905, production of bands and hoops was 445,527 tons, or about 30 per cent as much. Last year band, hoop and strip production was 33 per cent as large as total sheet production, all gages. Tin mill product of course is not reckoned. The various commodities are developing largely along their own lines. The contact in competition is relatively small.

Exit the Jacksonville Scale

TECHNICALLY the bituminous coal miners who belong to the United Mine Workers had been on strike for several years owing to the refusal of mine operators to pay a wage of $7.50 per day, the Jacksonville scale. Practically most persons had forgotten that there was a strike. For a long time mines that do not recognize any union have been producing all the coal that is needful through the labor of non-union miners and such members of the United Mine Workers as surreptitiously went to work. The fictions of the strike and the Jacksonville scale were maintained by the union officials in order to preserve a semblance of organization and authority, also payment of members' dues.

Last week John L. Lewis and his assisting committee abandoned the Jacksonville scale and authorized negotiations for district wage scale to be based on existing wages. This is a recognition that the market price must prevail in labor as well as in commodities. It is pitiful that Mr. Lewis so long deluded his followers into the belief that anything else could happen.

When labor unions come into conflict with economic law operating in freedom they are defeated every time. The recent collision must have been as disastrous to the United Mine Workers as was the recent general strike of labor unions in Great Britain. Probably it will cease to be a power in the bituminous coal fields. For a labor union to be successfully dictatorial it must be protected by restrictive legislation, as are the anthracite miners of Pennsylvania, or by restrictive membership (together with blackjacks and boycotts), as are the artisans of our seaboard, and some interior, cities. Why a long suffering public permits their strangling methods is one of the mysteries that has not been fathomed.

The Unemployment Issue

AS was to be expected, unemployment statistics are being given even more of a partisan twist as the lines of the Presidential contest are being drawn. Secretary Davis, in a report of March 24, this year, to the United States Senate, estimated that 1,874,050 persons were unemployed in the United States, taking as his basis a shrinkage of 753,107 between 1925 and 1928 in manufacturing and Class I railroad labor, or 7.43 per cent in those groups. Then he applied the same percentage to the total of 25,000,000 persons who were working for wages or salaries in 1925.

Probably the Secretary erred on the favorable side, in view of the heavy percentage of idleness in coal mining, with no conspicuous compensating increase. But certainly there will be distrust of an estimate of upward of 5,000,000 made in connection with a political attack on Secretary Davis's figure, and a large measure of reserve in respect to the figure of 4,000,000 put out

in February on behalf of the Labor Bureau, Inc., even after allowance for the seasonal increase in following months. The main fault is to be found with all high appraisals of idleness in industry in their assumption that persons who have left employment in a given line have taken up work in no other.

That, as we have pointed out heretofore, is also the weak point in many attempts to appraise the economic effect of the recent more rapid displacement of men by machines, as well as of that "new thought" in production engineering that has been so effectively at work since the depression of 1921.

Already in campaign discussion the question has been asked, what does this party or that party propose to do about unemployment. It seems to matter nothing that the issue is non-political and economic, just as the problem of a better living for the farmer is economic. There is ahead of us—more's the pity—a season in which the facts concerning momentous changes in industry are to be wrested for partisan advantage and in which appeals to prejudice will take the place of honest effort to meet new situations with new measures. Labor will be assured by political orators that much of the existing unemployment can be cured by legislation, whereas in fact the adjustments that must be made will require time and cannot be hurried by legislative makeshifts.

It could well be wished that the labor unions themselves would sense the opportunity of the present situation in industry. The millions the United Mine Workers have spent in a hopeless warfare to set aside economic law would have gone far toward solving the problem of relocating thousands of men who will never again get a livelihood from the mining of bituminous coal.

Good Showing by Structural Steel

PORTLAND cement is showing smaller gains in movement than formerly. Last year's increase in shipments was 6 per cent, while in the first half of this year there was a loss of 1 per cent from the first half of last year. Fabricated structural steel on the other hand has shown a sharp gain this year.

In this department of THE IRON AGE of Jan. 26, 1928, a 15-year comparison was made between fabricated structural steel and Portland cement. In 1913 the showing was 70.3 barrels of cement to one net ton of fabricated structural steel and in 1914 it was 68.2 barrels, while in the last five years, 1923-7, there was an average of 60 barrels. For the first half of this year the relationship was 50.8 barrels. Yet in the period covered by the comparison there developed a very large use of cement for road construction, which would help consumption of other forms of steel, chiefly in reinforcements. The fears of long ago that concrete would tend to supplant fabricated structural steel, or at least provide a very active competitor, have proved to be much exaggerated.

Fabricated structural steel has also gained in proportion to total steel made. In 1913-4-5 it averaged 102 pounds per gross ton of all steel ingots produced. In the first six months of this year the proportion was 116 pounds.

A few weeks ago we made reference to this being an active presidential year, citing steel production, freight car loadings, Portland cement and building contracts as evidence that this had been in no sense an "off" year to date. Now the fabricated structural steel statistics for the half year have become available, and they make a particularly favorable showing, just the sort needed to oppose the notion that politics tend to curtail trade and particularly the inception of long term investments.

Fabricated structural steel lettings in the first half of this year, computed by the Department of Commerce on the basis of actual returns from more than 80 per cent of the industry, were 1,586,250 net tons. Previously the best first half had been 1926, with 1,432,800 tons, and thus the record was passed by 10.7 per cent and the first half of 1927 by 13.7 per cent.

Another new record has been made. The second half of last year was the best second half. Twelve-month totals of lettings, through June 30, have been as follows: 1926, 3,035,940 tons; 1927, 2,853,000 tons; 1928, 3,254,750 tons. Shipments of the fabricating shops are reported separately, and are given at 3,008,000 tons in the 12 months through June 30. Subtracting this from bookings reported for the same period, it appears that the shops had 246,750 tons more business on books July 1 than on that date last year. Thus the steel industry has quite a backlog of business in that line of consumption.

Correspondence

Are Lower or Higher Iron and Steel Outputs Just Ahead?

To the Editor:—Ordinarily there is little to be gained by restating one's position, but the article by Mr. Thum in your July 12 issue is so clear and fair that it does seem worth while pointing out just how widely we differ.

We both agree, of course, in admitting that the world met with unexpected disaster in 1914, and that that calamity of itself accounts for a good deal of industrial irregularity. We agree that from an extreme low point in 1921 the world output of iron has risen to a high in 1927-28. We differ sharply as to what all this means, so far as the probabilities of the future are concerned.

Mr. Thum looks upon the 1921-28 rise as the beginning of a new cycle of progress; and feels that the World War simply caused a drag of twelve years in the normal industrial growth. If we accept his theory, we should look for new high records in world iron output in the years immediately to come.

I, on the contrary, feel that the World War came just at a time to accentuate a change in trend which was already visible; and that the rise of 1921-28 is merely a natural temporary recovery from sheer collapse. If I am right, we will not have to wait longer than 1929 or 1930 to see new *low* world iron records made—low, that is, for a number of years past. They may not reach the depths of 1921, but they may easily be closer to those than to the 1927-28 altitudes.

The two thoroughly ominous factors which will precipitate the next depression are in clear sight today; but, of course, no one can say which will act first. We have obviously a dangerous speculative position in America primarily. Security prices parted company with realities two years ago, and the final correction, however long delayed, is inevitable and may be spectacular. But we have also a far more serious factor which may bring about European trade collapse even before our own local conditions turn bad. I refer, of course, to the German reparations payments—or, rather, to the apparent impossibility of their being made.

EDWIN C. ECKEL.

Washington, July 19.

This Issue in Brief

In blast furnace operation, heavy white fog or smoke rising from slag runner indicates satisfactory reduction of sulphur. This condition is noticed when slag is highly saturated with calcium sulphide, in which form sulphur is removed.—Page 203.

* * *

Sheet steel roof proves excellent fire retardant. In test conducted by Bureau of Standards, galvanized steel roof with double locked cross seams and standing grooved seam held tight, even though red hot, preventing spread of flying embers and sparks, and eliminating "chimney effect."—Page 225.

* * *

In producing electric energy, fuel cost rises almost in proportion to output. Turbine room costs go up very slowly, and cost of steam exclusive of fuel not much more rapidly.—Page 205.

* * *

Statistics concerning only your own business are not sufficient. You must know not only what your own firm is doing, but must compare your company's performance with the industry as a whole, says Census Bureau official, in telling how business statistics should be used. —Page 204.

* * *

Recommends hot salt baths as a means of avoiding quenching cracks. Sorbitic structures can be obtained by quenching in melted salt at about 500 deg. C., giving physical properties "not inferior to those after water quenching and tempering," says Japanese metallurgist.—Page 210.

* * *

New low world iron output record, for recent years, is prophesied. E. C. Eckel says that ominous factors which will precipitate the next depression, as early as 1929 or 1930, are in clear sight today.—Page 234.

Sailor-welders are saving Government hundreds of thousands of dollars, says engineer. Every battleship has its own portable welding equipment, with competent welders among enlisted personnel. —Page 202.

* * *

Cuts costs by two-floor assembly system. First floor of motor truck plant is used for sub-assemblies, which are hoisted through hatchways and dropped on truck frames. Materials are received on first floor almost directly under the place where they will be required on second floor main assembly lines.—Page 206.

* * *

Fabricated structural steel is gaining over concrete. Production of Portland cement for first half of year was one per cent below same period of last year, while fabricated steel gained sharply. In the last five years, 1923 to 1927, ratio of output was 60 bbl. of cement to one net ton of fabricated structural steel. The ratio for first half of 1928 was 50.8 to 1.—Page 234.

* * *

Annealing furnace fired from top provides uniform temperature. Gas passes into furnace chamber through a series of ports located below and in line with a series of cast iron saddles on manifold. Flame is projected vertically downward. Close control has reduced the time of the cycle.—Page 212.

* * *

Solves moving assembly problem by installing chain conveyor which turns a corner. Otherwise, automobile engine builder would have had to use two conveyors, with the attendant expense of transferring engines from one conveyor to the other. The conveyor makes a 112-deg. turn.—Page 213.

Future of American manganese industry depends on solving the problem of using low-grade ores, Bureau of Mines official declares. Production of manganese ore in this country, he says, is rapidly approaching a point where materially higher prices will not, relatively speaking, increase production.—Page 214.

* * *

Steel is displacing concrete for automatic substation and switchhouse use. Steel housings containing completely assembled electrical equipment are placed where wanted. Steel housings cost less than concrete, are more easily and quickly erected, and are safer. Sheet steel is also replacing marble and slate for switchboard use. —Page 215.

* * *

Automotive output for first half of year approaches record. Production totaled 2,201,880 cars and trucks, which was 6½ per cent below the record of 2,358,585 units established in first half of 1926, but above every other half-year.—Page 226.

* * *

Healthy demand for machine tools reflects good business in metal trades. Even with subnormal buying in the two most important fields, railroad and automotive, machine tool purchases are holding at a high rate.—Page 258.

* * *

Wholesale average commodity price falls. June index figure was 97.6, compared with 98.6 in May, with 1926 average as 100.—Page 226.

* * *

See coal union's defeat in withdrawing demand for Jacksonville wage scale. Operators do not seem anxious to resume negotiations, as many mines are operating under open-shop conditions. —Page 224.

Iron and Steel Markets

July Improvement Maintained

Output Increased Slightly But New Orders Grow Individually Smaller and Outlook Is Dimmed by Buying Conservatism

STEEL making has stepped up slightly from a little under 75 per cent of capacity a week ago to a full 75 per cent rate. Against this, new business and fresh specifications on contracts fell off in the week, and orders appear to be growing individually smaller. The increasing conservatism in buying thus indicated makes it difficult to forecast more than a week or two. Yet none of the important channels of steel outlet has narrowed to any definite degree.

From the railroads there has been a normal steady consumption of bars, plates and shapes; but, if anything, improvement is looked for from this quarter in view of better earnings of important lines and good crop prospects. However, car buying, not now in evidence, would not immediately increase steel rollings, even if it were on a large scale, because of the time element in assembling car specialties prior to getting under production. Freight car shops are fast reaching the point where shutdowns are imminent.

The automotive and farm implement industries show little, if any, recession. The seasonal lull which has overtaken some automobile builders seems to be offset by greater activity of those bringing out new models. Output of the first half of the year, 2,201,880 passenger cars and trucks, was exceeded only by the production of the first half of 1926.

Further large line-pipe requirements are promised in plans of the Sinclair Pipe Line Co. to supply Chicago from the Southwest, taking 8 and 12-in. pipe, and in a line, which may come earlier, from Louisiana to Kansas City. One of the largest inquiries for oil storage tanks in some time, for 12 tanks in western Texas, will take 5000 tons of plates.

A firmer price stand is being taken by producers, with the result that more sales at the level being sought for the current quarter on the heavy tonnage products, 1.90c., Pittsburgh, have come to light. The 1.85c. base still obtains in cases on steel bars and is fairly common on plates.

Strip steel remains weak, and neither this form of steel nor cold finished bars are moving as freely as last month. Compared with other years at this season the showing remains favorable.

Tin plate contract releases have been sufficient to keep the American Sheet & Tin Plate Co. at a 90 per cent of capacity output through September.

Manufacturers of electric refrigerators and stoves have helped bring an upswing in sheet mill production. Prices appear less irregular, with efforts to hold a minimum of 3.40c., Pittsburgh, or 3.45c., Valley, for galvanized sheets, 2c., Valley, for blue annealed, and 2.60c., Pittsburgh, or 2.65c., Valley, for black. After some hot weather checks, the industry is back to nearly 85 per cent of capacity operations.

Sales of sheets showed a sharp gain in June, the records of the independent producers being 318,902 tons in June against 250,316 tons in May. Shipments were only 10,000 tons less than sales and unfilled orders at the end of the month remained substantially equal to those at the end of May.

Alloy steel bar mills continue at an 85 to 90 per cent rate, or only a few points below their peak.

Included in rail sales reported last week were 40,000 tons for the Norfolk & Western. Chicago reported purchases in the week of 6000 tons of track supplies and specifications for 7000 tons. The Hocking Valley bought 1400 tons of tie plates.

Pig iron prices show no strength. In addition to the decline of 50c. a ton on No. 2 foundry in the Valley, lower prices have appeared in New England, especially on the higher silicon grades. An eastern Pennsylvania steel company will probably buy 20,000 tons or more of basic iron this week.

Heavy melting steel scrap has strengthened at Pittsburgh, following many weeks of such low prices that many shippers have withheld supplies from the market. At Chicago, arrangements are being made to ship scrap by water to Lake Erie steel plants.

Canadian production of iron and steel in June was ahead of June last year and the output for the half year was the highest in ten years.

Welsh makers of tin plate, facing an uncertain market and easing prices, have decided to reintroduce a restriction of output, all mills to close for two weeks during the period of Aug. 27 to Nov. 24.

THE IRON AGE pig iron composite price has dropped to $17.04 a gross ton, from $17.09 of the two preceding weeks. The finished steel composite price remains at 2.319c. a lb. for the second week.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	July 24, 1928	July 17, 1928	June 26, 1928	July 26, 1927
No. 2 foundry, Philadelphia	$20.26	$20.26	$20.76	$20.76
No. 2, Valley furnace	*16.50*	16.75	16.75	18.00
No. 2, Southern, Cin'ti	19.19	19.19	19.19	20.94
No. 2, Birmingham	15.50	15.50	15.50	17.25
No. 2 foundry, Chicago*	17.50	17.50	18.00	20.00
Basic, del'd eastern Pa	19.00	19.00	19.00	20.75
Basic, Valley furnace	16.00	16.00	15.75	17.50
Valley Bessemer, del'd P'gh	18.76	18.76	18.76	29.26
Malleable, Chicago*	17.50	17.50	18.00	20.00
Malleable, Valley	17.00	17.00	17.00	18.00
Gray forge, Pittsburgh	18.01	18.01	18.01	19.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	90.00
Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh	32.00	32.00	33.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	39.00
O.-h. billets, Phila	37.30	37.30	38.30	38.30
Wire rods, Pittsburgh	42.00	42.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb	1.85	1.85	1.85	1.80
Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.80
Steel bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, New York	2.19	2.19	2.19	2.14
Tank plates, Pittsburgh	1.85	1.85	1.85	1.80
Tank plates, Chicago	2.00	2.00	2.00	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh	1.85	1.85	1.85	1.80
Beams, Chicago	2.00	2.00	2.00	2.00
Beams, New York	2.14½	2.14½	2.14½	2.04
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	July 24, 1928 Cents	July 17, 1928 Cents	June 26, 1928 Cents	July 26, 1927 Cents
Sheets, black, No. 24, P'gh	2.60	2.60	2.65	3.00
Sheets, black, No. 24, Chicago dist. mill	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, Pittsburgh	*3.40*	3.50	3.50	3.85
Sheets, galv. No. 24, Chicago dist. mill	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, Pittsburgh	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago dist. mill	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh	2.40	2.40	2.50	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.55	2.45
Barbed wire, galv., Pittsburgh	3.20	3.20	3.35	3.25
Barbed wire, galv., Chicago dist. mill	3.25	3.25	3.40	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$14.25	$14.00	$14.25	$15.25
Heavy melting steel, Phila	13.00	13.00	13.00	13.00
Heavy melting steel, Ch'go	12.25	12.25	12.50	12.25
Carwheels, Chicago	12.75	12.75	13.00	14.50
Carwheels, Philadelphia	15.50	15.50	15.50	15.00
No. 1 cast, Pittsburgh	14.25	14.25	14.25	15.00
No. 1 cast, Philadelphia	15.50	15.50	16.00	16.00
No. 1 cast, Ch'go (net ton)	13.50	13.50	13.50	14.50
No. 1 RR. wrot. Phila	13.50	13.50	13.50	15.50
No. 1 RR. wrot. Ch'go (net)	10.75	10.75	11.00	11.75
Coke, Connellsville. Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.60	$3.00
Foundry coke, prompt	3.75	3.75	3.75	4.00
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	14.75	14.75	14.87½	13.00
Electrolytic copper, refinery	14.50	14.50	14.50	12.75
Zinc, St. Louis	6.20	6.20	6.15	6.35
Zinc, New York	6.55	6.55	6.50	6.70
Lead, St. Louis	*6.00*	6.05	6.15	6.35
Lead, New York	6.20	6.20	6.30	6.50
Tin (Straits), New York	48.00	47.25	46.25	63.75
Antimony (Asiatic), N. Y.	9.37½	9.50	9.62½	12.50

On export business there are frequent variations from the above prices. Also, on domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Business Sufficient to Maintain 75 Per Cent Ingot Output—Usual Summer Slump Not Expected

PITTSBURGH, July 24.—With business in finished steel products sufficient to sustain an ingot production at 75 per cent of capacity, this rate representing a slight upturn, the idea is being dissipated that there will be the usual summer slump in output. The past week has been the best, with one exception, the American Sheet & Tin Plate Co. has had in sheets this year. The high rate of operation by independent sheet producers suggests that they, too, have been doing well. Leading tin plate manufacturers have specifications on contracts that support strongly the statement that no considerable amount of new business is necessary to insure mill operations of 90 per cent or higher well up to the end of September.

Good specifications are reported for steel bars, and while only a moderate amount of fabricated steel business is developing in this immediate area, the national prospect has rarely been brighter. A fair-sized order for standard-section rails came to the local producer in the past week. Line pipe orders are the principal prop to pipe mill operations, but at the same time producers are generally reporting an improved demand for oil well pipe. Wire products are dull. Cold-finished steel bars and strip steel are not moving with quite as much freedom this month as they did in June. The loss of tonnage, however, is slight and the showing is favorable when comparison is made with other years at this season.

None of the important channels of steel outlet has narrowed materially. Much surprise is expressed that the demand from the automobile builders is holding up so well; one explanation is that the used car problem is less serious than usual, owing to the fact that not a few of the better cars taken in trade for new cars are being reconditioned and exported to South American countries and sales of new cars are less hampered than usual by bargains in used cars.

As to steel prices, it is noticed that strips still are weak and that the effort to establish bars, plates and shapes upon a higher basis is not gaining rapid headway. There is little question that some companies covered their customers fully for this quarter at 1.85c., base Pittsburgh, and there was no other course open to others but to keep the doors ajar for their patrons. Possibly a little difficulty might be encountered now in entering new business at less than 1.90c., base, but there has been such wide coverage as to preclude the occasion for much new buying. The sheet market appears stronger here than in some other markets and there are suggestions that the decline must be checked soon if there is to be any possibility of more satisfactory returns on fourth quarter business.

Foundry iron is easier and the pig iron market as a whole is little more

than nominal, since demands are very limited. The scrap market, on the other hand, is slightly firmer; there is a considerable short interest in heavy melting steel and some of the dealers who sold short probably are nervous as offerings are very light at present prices. The situation in the fuels is dull and depressed.

Ferroalloys.—While the steel industry is operating at a high rate for the time of year, it is below full capacity and consumption of all primary materials is well under the rate of the early months of the year. Liberal takings last month against expiring first half ferromanganese contracts have given users enough of this alloy to carry them through this month, and accordingly there is not much specifying on second half commitments. Spiegeleisen is not being ordered out as freely as was the case a few weeks ago, but there is little complaint as to the movement of high grade ferrosilicon. Spot demands for all three alloys are few and small. Prices are unchanged.

Pig Iron.—Foundry iron is weaker in this market. While most producers continue to quote $16.75, Valley furnace, for No. 2 grade—and small lots are being moved at that price—the more important tonnages are going at $16.50. The Westinghouse Electric & Mfg. Co., which recently closed for its requirements over the remainder of this year, is believed to have secured its supplies at the latter price, although the iron is somewhat special in analysis. Other sales of more than carload lots having been made at that price, the market now is clearly quotable at $16.50 to $16.75. No corresponding decline is noted in the foundry irons of lower silicon content. There seems to be some scarcity of No. 3 and gray forge iron, and instead of being at a discount of 50c. a ton from the base grade, the difference is measured by 25c. One sale of 300 tons of Bessemer iron is reported at the full quotation of $17, Valley furnace. Malleable iron is quoted at the same price as Bessemer, but only scattering small sales are being made. Interest in basic iron is low, and while this grade is commonly quoted at $16, Valley furnace, the price is merely nominal as there are no sales. The Standard Sanitary Mfg. Co. was a buyer within the week of about 2500 tons of foundry iron for shipment in this quarter to its Louisville, Ky., works. It bought Southern iron, paying $15.50, Birmingham, for the base grade. This was merely fill-in buying, none of which will be necessary for the local plants, which are carrying over enough first half iron to supply this quarter's needs. Carnegie Steel Co. has put on a furnace which has been down for repairs and now has 27 of its 49 stacks in production. The Adrian furnace, Dubois, Pa., will be blown in Aug. 1 for a brief campaign to liquidate its ore pile.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$16.00
Bessemer	17.00
Gray forge	$16.25 to 16.50
No. 2 foundry	16.50 to 16.75
No. 3 foundry	16.25 to 16.50
Malleable	17.00
Low phos., copper free	26.50

Freight rate to Pittsburgh or Cleveland district, $1.76.

Semi-Finished Steel.—Billets, slabs and sheet bars are all at $32, Pittsburgh or Youngstown, for delivery on third quarter contracts, but on spot tonnages of large billets and slabs the usual quotation is $33, and producers already are mentioning $33 as the fourth quarter contract price on sheet bars. Specifications are fairly heavy. Improving welded pipe mill operations are responsible for heavier releases of pipe skelp. Wire rods are only moderately active; the regular quotation is $42, base Pittsburgh or Cleveland, and reports that less is being done, makers assert, refer to deliveries against some old contracts which were not cancelled. Forging quality billets still are priced at $38, base Pittsburgh.

Bars, Plates and Shapes.—While the price of 1.85c., base Pittsburgh, has not disappeared, there being considerable pending tonnage on which that price was quoted, buyers are experiencing difficulty in finding producers willing to take on new business for shipment during the remainder of this quarter at less than 1.90c. On the other hand, there was so much covering by the mills of customers for this period at 1.85c., base, that there is left only the small spot tonnages, which as often as not command a slight premium over the contract price. Announcement of the fourth quarter price so long in advance of the opening of that period still occasions wonderment among fabricators and distributers, since there is no evidence of the sold-up condition of steel mills that in former years led to announcements of price advances well in advance of their application. But there is no lack of seriousness among the steel manufacturers in the effort to bolster prices, and it is believed that in giving the users an opportunity to revise secondary prices there is a good chance that the 2c. price will become effective on last quarter tonnages.

Rails and Track Supplies.—The Norfolk & Western Railroad has placed 40,000 tons of standard-section rails, 29,000 tons going to the Carnegie Steel Co. and the remainder to the Bethlehem Steel Co. This road's orders are fully one-third smaller than the average of the past few years. A local mill recently booked 2400 kegs of spikes and about 1400 tons of tieplates for the Hocking Valley Railroad. Except for these awards, rail and track accessory business has been rather slack.

Wire Products.—The recent downward revision in prices has produced a steady market. Business, taken as a whole, however, has not increased materially, probably because the movement into consumption has not been heavy enough to overcome the large mill shipments early in the year, which were stimulated by the desire to avoid price advances.

Tubular Goods.—Mills are well supplied with pipe line business, and while backlogs are small in other classes of tubular goods, it is noticed that there is a very steady demand for pipe for building and construction work and oil country pipe is selling with more freedom than it did early in the year. Mill operations are fully 70 per cent of capacity, a good showing compared with that of a month or six weeks ago.

Sheets.—There is no occasion for complaint as to the volume of sheet

The Iron Age Composite Prices

Finished Steel

July 24, 1928, 2.319c. a Lb.

One week ago	2.319c.
One month ago	2.341c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

July 24, 1928, $17.04 a Gross Ton

One week ago	$17.09
One month ago	17.21
One year ago	18.42
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c. to 2.00c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.25c. to 2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Bethlehem	2.00c. to 2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.01c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.10c. to 2.20c.
From 3 in. to 6 in., P'gh	1.85c. to 2.00c.
6 in. and wider, P'gh	*1.75c. to 1.90c.
Narrower than 3 in., Chicago	2.30c.
From 3 to 6 in., Chicago	2.20c.
6 in. and wider, Chicago	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle	$1.27
2000 bundle lots	1.25
Larger lots	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.15c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, 1 up to 3 tons, P'gh	2.90c. to 3.00c.
Strips, 1 up to 3 tons, Cleveland	2.90c.
Strips, 1 up to 3 tons, del'd Chicago	3.30c.
Strips, 1 up to 3 tons, Worcester	3.15c. to 3.30c.
Fender stock, Pittsburgh	4.10c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	3.20
Barbed wire, painted	2.95

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.10c.
Nos. 9 and 10, del'd Cleveland	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.60c. to 2.65c.
No. 24, f.o.b. Chicago dist. mill	2.75c.
No. 24, del'd Cleveland	2.74c. to 2.84c.
No. 24, del'd Philadelphia	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham	2.95c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.40c. to 3.55c.
No. 24, f.o.b. Chicago dist. mill	3.60c.
No. 24, del'd Cleveland	3.54c. to 3.69c.
No. 24, del'd Philadelphia	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham	3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.85c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C. $11.20	25-lb. coating I.C. $16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)
Alloy Quality Bar Base, 2.65c.

S.A.E. Series Numbers		Alloy Differential	Net Price 100 Lb. Bars
2000	(½% Nickel)	$0.25	$2.90
2100	(1½% Nickel)	0.55	3.20
2300	(3½% Nickel)	1.50	4.15
2500	(5% Nickel)	2.25	4.90
3100	Nickel Chromium	0.55	3.20
3200	Nickel Chromium	1.35	4.00
3300	Nickel Chromium	3.80	6.45
3400	Nickel Chromium	3.20	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.70
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.00
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.10
5100	Chromium Spring Steel	0.20	2.85
6100	Chromium Vanadium Bars	1.20	3.85
6100	Chromium Vanadium Spring Steel	0.95	3.60
9250	Silicon Manganese Spring Steel	0.25	2.90
Chromium Nickel Vanadium		1.50	4.15
Carbon Vanadium		0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel		Charcoal Iron
Under 5000 lb.	4 Fives	1 Ten
5000 lb. to 12,000 lb.	5 Fives	2 Tens
12,000 lb. to 21,000 lb.	6 Fives	2 Tens & 2½
21,000 lb. and over	7 Fives	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	45
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ and 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Less carloads, 4 points less. Add $3 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

business, nor of the rate of mill operations, which in the past week have taken an upward swing. Because of some liberal releases by the automotive industry, the orders of the American Sheet & Tin Plate Co. in the past week were the largest, with one exception, of any week this year. This company's business this month has been equal to 90 per cent of its productive capacity. Independent companies also have fared well and the industry at large is averaging close to 85 per cent of capacity, the American Sheet & Tin Plate Co. having moved to an 81 per cent rate. Prices appear to be a little firmer. While lower prices have been noted in some markets, 2.65c., base, Pittsburgh, still is regarded as the minimum here on black sheets. Galvanized sheets are readily obtainable at 3.50c., base, Pittsburgh, but there are some small sales at 5c. per 100 lb. higher. On blue annealed, 2c., base, is the prevailing price, despite lower prices on this grade by manufacturers of strips and light plates. Generally, however, there is less pressure to sell, as few mills lack orders.

Tin Plate.—Leading producers are well sold up for the next 60 days on specified contract commitments; mill operations continue at 90 per cent or more of capacity. Current demand does not amount to much and makers are well satisfied, as the weather is against efficient mill operations.

Cold-Finished Steel Bars and Shafting.—Demand, particularly from the makers of automobile parts, is steady. July bookings and specifications average well up to those of last month, which is a pleasant surprise in view of the fact that July ordinarily brings a recession. Prices are steady at 2.10c., base, but some makers say that if the price of hot-rolled bars is fully established on fourth quarter business at 2c., base, they must get more than an advance of 10c. per 100 lb. on fourth quarter tonnages.

Hot-Rolled Flats.—Orders and specifications for hot-rolled strips so far this month are below those for the corresponding period in June. Wide strips are weak because of the stronger desire among producers for orders and the competition of other flat-rolled products. Narrow material is fairly steady in price, and hoops and bands are firm at 2.20c., base. Narrow strips range from 2.10c. to 2.20c.; 3 to 6-in., 2c., and 6-in. and wider, 1.80c. to 1.90c.

Cold-Rolled Strips.—This month's business has been slightly smaller than in the same period last month. Prices still are rather soft, but with 2.75c., base, Pittsburgh, for lots of 3 tons or more of one size and temper for shipment at one time ruling on most of the business. In a few cases embracing particularly desirable business as low as 2.65c has been done, but on the other hand material for typewriters, adding machines and cash registers, tonnages of which are small and the specifications exacting, has been going at 2.85c. to 2.90c., base, or 3.10c. to 3.15c., base, for lots of 1 to 3 tons.

Bolts, Nuts and Rivets.—Business is only moderately active, but prices are holding firmly.

Coke and Coal.—The action of the policy committee of the United Mine Workers of America in withdrawing the Jacksonville scale as a basis of wage scale negotiations has been without effect, marketwise, except possibly to strengthen the idea of buyers that they have nothing to fear in the way of shortages. Demand for coal is duller, if that is possible, than it has been and prices are as much as ever in buyers' favor. There is no well defined spot market for beehive coke. Occasional cars of furnace and foundry grade are moved at quoted prices.

Old Material.—The market here is a shade firmer. One mill has purchased a fair-sized lot of heavy melting steel at $14.50, while dealers who recently went short of good-sized lots at two consuming points in the district are finding it rather difficult to cover at much under $14, the price at which they sold. While small lots are being picked up at $13.50 and $13.75 by dealers, there are no sizable offerings at such prices, and if the mills that bought were to press for deliveries, some active and competitive bidding might be expected. The short interest in this grade is heavy, and it is reasonably safe to say that prices have struck a bottom in view of this shortage. There have been sales of compressed sheets at $14 and of bundled sheets at $13 and $13.25, while scrap rails have been moved at $14, these prices being slightly more than could have been obtained previously. There is little activity in other directions and no material change in prices.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel	$14.00 to $14.50
Scrap rails	13.50 to 14.00
Compressed sheet steel	13.75 to 14.00
Bundled sheets, sides and ends	13.00 to 13.25
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	14.50 to 15.00
Heavy breakable cast	11.50 to 12.00
No. 2 railroad wrought	14.00 to 14.50
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	9.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	14.75 to 15.25
Railr. coil and leaf springs	14.75 to 15.25
Rolled steel wheels	14.75 to 15.25
Low phos. billet and bloom ends	19.00 to 19.50
Low phos., mill plate	17.50 to 18.00
Low phos., light grade	16.50 to 17.00
Low phos. sheet bar crops	17.50 to 18.00
Hvy. steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phos. punchings	16.00 to 16.50
Hvy. steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shov'l'g steel turnings	9.50
Short mixed borings and turnings	9.50
Cast iron borings	10.00
No. 2 busheling	8.50 to 9.00
Rolling Mill Grades:	
Steel car axles	18.00 to 18.50
No. 1 railroad wrought	10.50 to 11.00
Sheet bar crops	16.00 to 16.50
Cupola Grades:	
No. 1 cast	14.25 to 14.50
Rails 3 ft. and under	15.00 to 15.50
Malleable Grades:	
Railroad	13.75 to 14.50
Industrial	13.25 to 13.75
Agricultural	12.75 to 13.25

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.55c.
Galv. sheets (No. 24), 25 or more bundles	4.40c.
Blue ann'l'd sheets (No. 10), 25 or more sheets	3.10c.
Galv. corrug. sheets (No. 28), per square	$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Locomotives in Much Better Repair

Fewer locomotives were in need of repair on the Class I railroads on July 1 than at any time since the compilation of these reports began, according to reports filed by the carriers with the Car Service Division of the American Railway Association.

The number on July 1 was 8006 locomotives, or 13.4 per cent of the number on line. This was a reduction of 251 locomotives compared with the best previous record, which was established on Jan. 1 last. At that time there were 8257 locomotives awaiting repairs, or 13.6 per cent. The number on July 1 showed a reduction of 753 compared with the same date in 1927, when there were 8759, or 14.3 per cent.

Production of bituminous coal in the United States in the week ended July 14 is reported at a daily average of 1,435,000 net tons. This is higher than in either of the two preceding weeks and is nearly 5 per cent above the figure for a year ago. For the calendar year to date a total of 249,726,000 tons has been mined, compared with 291,233,000 last year to the same date.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$32.00 to $33.00
Rerolling, under 4-in. to and including 1¾-in.	33.00 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$32.00 to $33.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$32.00 to $33.00
Smaller than 8 in. x 2 in.	33.00 to 34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00
Screw stock	$5.00 per ton over base

*Chicago mill base is $43. Cleveland mill base, $42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron;	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$11.00 to $11.25

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey city, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.05
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.15

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$17.00
No. 2 lump, Illinois and Kentucky mines	$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including ⅜ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(7/8-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut threads	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Demand Steady, Though Orders Are Individually Smaller—Mill Operations Continue at 75 Per Cent

CHICAGO, July 24.—Local mills are still able to operate at 75 per cent of capacity, but both specifications and orders are growing individually smaller, reflecting increasing conservatism on the part of buyers. Total bookings of producers show surprisingly little change, but the character of current business is such as to make it difficult to forecast operations for more than a week or two ahead. Sales and specifications in the past seven days were nearly as large as in the previous week and considerably heavier than in the first week of July. New commitments in bars and track materials exceeded those in other products. Specifications from the automotive and farm equipment industries show little, if any, recession, and heavier releases have come from makers of cold-drawn steel bars and manufacturers of bolts, nuts and rivets, who had permitted stocks to run below their normal requirements.

A steady flow of specifications for bars, shapes and plates is coming from the railroads. The carriers also account for the good volume of business in track supplies, sales of these products for the week having totaled 6000 tons and specifications 7000 tons. Improved earnings by Northwestern roads, as well as good crop prospects, are expected to result in more liberal purchases of steel in coming months. Meanwhile, railroad car buying shows no indications of reviving on a broad scale and the shops of freight car builders are fast reaching the point where they must shut down. Such a suspension of operations cannot be avoided even if large car orders are placed this month because it takes fully 60 days to assemble materials before work on a car order can be started.

An inquiry for 5000 tons of steel for 12 storage tanks to be built in western Texas is particularly opportune in view of the growing shortage of heavy tonnage orders. Another promising development in the oil industry is the announcement that the Sinclair Pipe Line Co., jointly owned by the Standard Oil Co. of Indiana and the Sinclair Consolidated Oil Corporation, plans to spend $15,000,000 on an 8 to 12-in. pipe line from the Southwest to Chicago. No figures have been taken on this project and no doubt some time will elapse before orders for the steel are actually placed. A proposed pipe line from Louisiana to Kansas City is expected to mature earlier.

Lettings of fabricated steel are lighter and few new projects are coming out for figures. Fabricators are still fairly well engaged, particularly on smaller jobs, but the trend of the situation is reflected in the fact that the larger structural mills are not operating so well as those rolling smaller sections.

Mill prices are unchanged. The determination of producers to strengthen the market is seen in an announcement by the leading local independent that it has followed the Steel Corporation subsidiary in advancing plates, shapes and bars to 2.10c., Chicago, for fourth quarter deliveries. On new business for the current quarter, 2c., Chicago, is the ruling price, and that was also the governing quotation on most third quarter contracts. Some of the tonnage buyers who usually get a preferential price because of quantities they take in desirable specifications were able to close contracts for this quarter at 1.95c.

Blast furnace operations in this district are unchanged. While some of the steel mill stacks are piling pig iron and using a larger proportion of pig metal in their open-hearth furnaces, the scrap market appears to be holding its own. A local independent steel producer bought several thousand tons of steel scrap at recently ruling prices, including heavy melting steel at $12.75, and another interest bought several small lots at $13.

The local scrap trade is investigating the possibility of shipping scrap by water to Lake Erie ports and, if present negotiations are successful, a cargo will be moved from Chicago within the next few weeks.

Ferroalloys.—It is understood that several large buyers of ferromanganese did not contract for their second half requirements and a large Michigan consumer claims to have bought within the past few weeks at less than the ruling quotation of $105, seaboard. A number of users still have large stocks and those with contracts for this half are not yet actively specifying. There are a few car lot inquiries for spiegeleisen, which continues to range from $32 to $33, furnace, for 19 to 21 per cent material.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $40.76.

Pig Iron.—A local consumer is in the market for 2000 tons of foundry iron for shipment over the remainder of the year. No other large inquiries are reported, but a fair amount of spot buying has developed during the week. The fact that no concessions are being offered at the new price level is tending to increase confidence in the stability of the market. Foundry operations are spotty, but in some directions melt is improving, as evidenced by the fact that a large Milwaukee plant and several Michigan shops are advertising for molders. Several motor car companies that have brought out new models are increasing production, and this has resulted in heavier specifications for silvery iron. Shipments of pig iron from Chicago district furnaces are about on a par with those of June. Sales in this market in the first seven months of this year kept pace with those of the same period in 1926, a year which broke all previous records in both sales and shipments. An inquiry for 500 tons of low phosphorus is before the trade.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.00
Malleable, not over 2.25 sil.	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	21.51
So'th'n No. 2 (barge and rail)	21.01
Low phos., sil. 1 to 2, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15%	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Bolts, Nuts and Rivets.—Specifications are a trifle lighter than in June, but better than usual for this season.

Plates.—The Texas & Pacific Oil Co. is in the market for 12 80,000 bbl. oil storage tanks for western Texas, calling for a total of 5000 tons of plates. This is the first inquiry for storage tanks in some time. Local plate mills could use heavy-tonnage orders to advantage at this juncture, but they are still able to operate at a 65 per cent rate, despite the miscellaneous character of current business. Orders and specifications in the past seven days were not quite so heavy as in the previous week, although larger than in the first week of the month. Mill prices are steady at 2c., Chicago, on new business, and the majority of third quarter contracts carry that price, although some preferential buyers who take large tonnages in attractive specifications were able to cover at 1.95c.

Mill prices on plates, per lb.: 2c., base Chicago.

Structural Material.—The A. O. Smith Corporation, Milwaukee, has placed from 2500 to 3000 tons for a pipe shop with the Wisconsin Bridge & Iron Co. Other fabricating awards in Wisconsin total more than 1200 tons, but lettings in this city and vicinity are light. A number of large tonnages are pending here, including 7000 tons for junior high school buildings. Meanwhile, the larger structural mills are feeling the lack of new business. Nevertheless, production of plain material as a whole remains at a higher rate than plate mill operations. Mill prices are holding to 2c., Chicago.

Mill prices on plain material, per lb.: 2c., base, Chicago.

Bars.—Bar mill products continue to lead other forms of finished steel in both sales and specifications. Business from the automobile and farm equipment industries shows little, if any, recession. Mill prices on soft steel bars are steady at 2c., Chicago. Mills rolling alloy steel bars, which are more largely dependent on the automotive industry, are operating at 85 to 90 per cent of capacity, or only a

few points below their peak. Bookings in bar iron, particularly from the railroads, are keeping up well, and mill prices are consistently 2c., Chicago. Rail steel bar producers find production, specifications and shipments are ahead of those in July, 1927. Bed makers, who have experienced dull times for nearly a year, made heavy sales at the recent Furniture Exposition and are more liberal in specifying for rail steel. Farm equipment makers continue to take a steady flow of tonnage. Rail steel bars are unchanged at 1.85c., Chicago Heights mill.

Mill prices per lb.: Soft steel bars, 2c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Sheets.—Business shows no improvement, but prices are unchanged. Because of uneven specifications and hot weather, Chicago district mills operated at less than 60 per cent of capacity last week.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c.; No. 24 galv., 3.65c.; No. 10 blue ann'l'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chgo. deliv'd prices.

Reinforcing Bars.—There continues to be a good run of lettings of less than 100 tons each, but large awards are less numerous. Action on pending work is being delayed more than usual, possibly on account of the vacation season. Bending shops are still able to operate at 75 to 80 per cent of capacity. Awards and fresh inquiries are shown on page 230.

Tin Plate.—Mills have excellent bookings and are now insisting on a minimum of $5.35 per base box, Gary, on standard coke plate from all buyers in this territory.

Wire Products.—Mills continue to operate at 65 per cent of capacity, and specifications are the best for any July in a number of years. Much of the current tonnage, however, is coming from the manufacturing trade rather than from jobbers. Nail demand in the Chicago metropolitan area has been adversely affected by the trend of residential construction, which for the year to date has declined about 40 per cent compared with the same period in 1927. The outlook in the agricultural sections is promising, but actual buying by the farmers will be held back until their heavy field work is completed. Mill salesmen are again on the road, however, and improved business in certain lines, such as fencing, is expected to manifest itself by the middle of next month. For mill prices see page 239.

Rails and Track Supplies.—The Norfolk & Western has placed 29,000 tons of rails with the Carnegie Steel Co. and 11,000 tons with the Bethlehem Steel Co. New rail bookings by local mills were confined to three small orders totaling 1200 tons. Rail production of the leading mill continues at 60 per cent of capacity. Sales of track fastenings during the week totaled 6000 tons, while specifications aggregated about 7000 tons. Light rail business is restricted to scattered car lot sales, but bookings in June were about twice the recent monthly average.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—Bids taken by Milwaukee July 18 on 2000 tons brought out prices ranging from $33 to $34.30, Birmingham. Only one bid, that of the United States Cast Iron Pipe & Foundry Co. on 750 tons of 6-in., was as low as $33. Most quotations on current business range from $34 to $35, Birmingham, for 6-in. and larger diameters. St. Paul, Minn., has awarded 1100 tons of 6 to 16-in. pipe to the United States Cast Iron Pipe & Foundry Co.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $41.20 to $43.20; 4-in., $45.20 to $47.20; Class A and gas pipe, $4 extra.

Old Material.—A local mill has bought several thousand tons of heavy melting steel, compressed sheets and borings at prices in line with those quoted below. The fact that these orders did not develop new weakness in the market indicates a steadier situation than some traders had looked for. While some mills are using more pig iron and less scrap, there are no heavy accumulations in dealers' hands. Dealers have been doing little speculating and are shipping out material, as a rule, as fast as it is prepared. Prices have shown no marked change during the week and apparently will not be disturbed greatly unless heavy railroad offerings come on the market. A further possible decline in mill operations, of course, is also a factor that must be considered. Foundry operations are spotty. In Michigan, however, the melt is improving, especially among malleable foundries serving the automobile industry. The Chicago, Burlington & Quincy takes bids today on 500 tons of scrap.

Prices deliv'd consumers' yards, Chicago:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$12.25 to $12.75
Shoveling steel	12.25 to 12.75
Frogs, switches and guards, cut apart, and misc. rails	13.50 to 14.00
Hydraul. compressed sheets	11.00 to 11.50
Drop forge flashings	9.50 to 10.00
Forg'd, cast and r'l'd steel carwheels	15.50 to 16.00
Railr'd tires, charg. box size	15.50 to 16.00
Railr'd leaf springs, cut apart	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.75 to 14.25
Coil springs	15.75 to 16.25
Electric Furnace Grades:	
Axle turnings	12.50 to 13.00
Low phos. punchings	14.00 to 14.50
Low phos. plate, 12 in. and under	14.00 to 14.50
Blast Furnace Grades:	
Axle turnings	9.50 to 10.00
Cast iron borings	9.00 to 9.50
Short shoveling turnings	9.00 to 9.50
Machine shop turnings	6.00 to 6.50
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	14.75 to 15.25
Cupola Grades:	
Steel rails less than 3 ft.	15.25 to 15.75
Angle bars, steel	14.25 to 14.75
Cast iron carwheels	12.75 to 13.00
Malleable Grades:	
Railroad	12.50 to 13.00
Agricultural	11.50 to 12.00
Miscellaneous:	
*Relay'g rails, 56 to 60 lb.	23.00 to 25.00
*Relay'g rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angles and splice bars	13.50 to 14.00
Iron arch bars and transoms	19.50 to 20.00
Iron car axles	24.00 to 24.50
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	10.75 to 11.25
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.50 to 10.00
No. 2 busheling	5.75 to 6.25
Locomotive tires, smooth	12.00 to 12.50
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	12.75 to 13.25
No. 1 agricultural cast	12.50 to 13.00
Stove plate	10.75 to 11.25
Grate bars	11.25 to 11.75
Brake shoes	10.00 to 10.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.30c. to 3.00c.
Reinforc'g bars, hard steel	2.00c. to 2.70c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.65c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, stand. railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60

No. 8 black ann'l'd wire, per 100 lb.	$3.30
Com. wire nails, base per keg	3.10
Cement c't'd nails, base per keg	3.10

Railroad Equipment

PURCHASE of 150 box cars by the International Railways of Central America and an inquiry from the Missouri Pacific for 100 automobile cars are the only features of a dull market. Details follow:

International Railways of Central America have purchased 150 box cars from Gregg Co.

United States Navy Department has ordered one tank car for carrying helium gas from General American Tank Car Corporation and is inquiring for two gondola cars.

Cities Service Co. is inquiring for 10 tank cars in addition to four reported ordered last week.

Chicago Great Western has ordered three mail and baggage cars from Pullman Car & Mfg. Corporation.

Carnegie Steel Co. has ordered repairs to 16 hopper cars from Greenville Steel Car Co.

Canadian National has ordered three mail and baggage cars from American Car & Foundry Co.

Missouri Pacific is inquiring for 100 50-ton single-sheathed automobile cars.

New York

Pig Iron Buying Fairly Well Sustained—Newspaper Building Takes 13,000 Tons of Steel

NEW YORK, July 24.—Following a week of rather heavy buying for this season of the year, pig iron sales during the last week have kept up at a fair rate, totaling about 7500 tons. In some cases this tonnage represents extensions of second quarter contracts which have just now run out, and the bulk is for delivery during July and August. There is evidence that many melters have not yet covered fully for their third quarter requirements, but they find no difficulty in arranging immediate shipments and are thus able to maintain extremely low reserves. Many large consumers are carrying stocks of iron hardly sufficient for a week's operations. The week's sales, which consisted mostly of small lots, also give further indication of the increased melt of foundries in this district. New inquiry is not large, but melters are often buying without the usual delays, indicating their immediate need of supplies. Interest in fourth quarter requirements is evidenced by an inquiry for that period from the A. P. Smith Mfg. Co., East Orange, N. J., for 750 tons of No. 2 plain and No. 2X. Another New Jersey melter is said to be in the market for 1000 tons and a user served by this district is negotiating for the purchase of 2500 tons, both of these prospective purchases being for August and September delivery. The recent inquiry for 2000 tons of ballast iron for shipment to the Pacific Coast is still pending, but may not be acted upon, at least not in full. A large manufacturer of heating equipment in western Massachusetts is expected to come into the market for a round tonnage next week. There is little change in the price situation, with Buffalo foundry iron offered at $16 to $17, furnace, and the ruling price tending more toward the lower than the higher figure. Eastern Pennsylvania producers are quoting $19.50, furnace, for the base foundry grade, and since the recent 50c. reduction have been showing more interest than before in meeting the competition of Buffalo makers in New Jersey.

Prices per gross ton, deliv'd New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.39 to 22.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.89 to 23.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Bars, Shapes and Plates.—Some sales of steel bars, one or two of 100 tons, have been made at the new price of 1.90c., Pittsburgh, to consumers who did not sign third quarter contracts. Small lots of plates and shapes have also been sold at the $1 a ton advance, or 2.22½c., New York, for plates, and 2.19½c., New York, for shapes. However, so many buyers are covered by extensions of second quarter prices that the higher prices have appeared so far on only a small part of the steel shipped this month.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.60c. to 3.80c.
No. 22	3.75c. to 3.95c.
No. 24	3.80c. to 4.00c.
No. 26	3.90c. to 4.10c.
No. 28*	4.05c. to 4.25c.
No. 30	4.30c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.15c. to 4.35c.
No. 16	4.00c. to 4.20c.
No. 18	4.15c. to 4.35c.
No. 20	4.30c. to 4.50c.
No. 22	4.35c. to 4.55c.
No. 24	4.50c. to 4.70c.
No. 26	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

There is no mistaking, however, the firmer attitude of producers, which extends to the fourth quarter price of 2c., Pittsburgh, on these products. Demand for bars continues fairly active for this time of year, while the specifying of structural steel for building construction now under way gives structural mills a fairly high rate of operation. Plate demand is less active, but Eastern mills are running at about the same rate as in recent weeks. The outstanding structural steel award of the week was 13,000 tons for the *Daily News* building on East Forty-second Street, New York, which was taken by the Harris Structural Steel Co.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; struct. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Sheets.—Some of the larger producers of sheets are taking a firmer stand on prices. In several instances mills have declined business in black sheets offered at 2.60c., Pittsburgh, and have insisted on a minimum of 2.65c. On galvanized sheets, 3.40c., Pittsburgh, has been reaffirmed by these mills as their minimum, notwithstanding that a few sales had been made at 3.35c. The 3.40c. price generally applies to orders from jobbers and most consumers are being asked to pay 3.50c. Sales of the blue annealed sheets have been made at 1.90c. and 1.95c., Pittsburgh, but these concessions are not general and the bulk of current business is at not less than 2c., Pittsburgh. The volume of sheet buying is fairly satisfactory, but it is nearly all spot business, few consumers or jobbers having made contracts for this quarter.

Reinforcing Bars.—Bids will close July 25 on a high school at White Plains, N. Y., which will require about 500 tons of bars. This is the largest new project reported recently, but there is still a fair volume of pending tonnage, including a warehouse in the Bronx for the Lehigh Valley Railroad, which will take 1200 tons. Day & Goater, Inc., is reported to have secured the contract for a section of the subway in New York, on which Rodgers & Hagerty, Inc., is general contractor, calling for approximately 700 tons. On the general run of small orders, 1.90c., Pittsburgh mill, is the ruling price, but on some recent larger jobs concessions of at least $1 a ton have been reported. Warehouse prices are unchanged.

Warehouse Business.—Jobbers report that orders are slightly larger in size than during June and the total July tonnage is expected to be greater than for several months. There is a moderate demand for blue annealed sheets, on which the quoted price of 3.90c. per lb., base, is being maintained. Black and galvanized sheets, however, are being shaded in the metropolitan district and concessions from 3.80c. per lb. on black and 4.50c per lb. on galvanized are not unusual on desirable orders.

Cast Iron Pipe.—Quotations of

Birmingham makers of pressure pipe continue in excess of the prices of Northern foundries, but business in this district is small and operations of makers in the North are still rather limited. Delivered prices continue to range from $37.60 to $38.60 per ton, New York. The American Construction & Securities Co., New York, is reported to have closed on about 800 tons of water pipe with two Birmingham makers, half for use near Birmingham and half for delivery to Pittsburgh. Newark, N. J., has closed on 300 tons of water pipe with the Warren Foundry & Pipe Co., and the Department of Water Supply, Gas and Electricity, New York, has awarded 300 tons of 8 and 12-in. pipe to the same company.

Prices per net ton, deliv'd New York: Water pipe 6-in. and larger, $37.60 to $38.60; 4-in. and 5-in., $42.60 to $43.60; 3-in., $52.60 to $53.60; Class A and gas pipe, $4 to $5 extra.

Coke.—Conditions in this market have not changed materially during July except for a slight increase in consumption of foundry coke. Demand for the special brands is keeping up and ovens report steady specifications which do not allow the accumulation of stocks. Foundry coke is unchanged at $3.50 per net ton, Connellsville, with the furnace grade quoted at $2.50 to $2.75. Special brands of foundry coke are offered at $4.85, f.o.b. ovens, and delivered prices are $8.56 per net ton to northern New Jersey, Jersey City and Newark and $9.44 to New York and Brooklyn. By-product foundry coke is unchanged at $9 to $9.40, Newark or Jersey City, and $10.06 to $10.29, New York or Brooklyn.

Old Material.—Dealers' buying prices on most grades show further slight reductions, based on recent sales to eastern Pennsylvania consumers. No. 1 heavy melting steel is being bought at $12.50 per ton, delivered eastern Pennsylvania, and yard grade is quoted at about $10 per ton, delivered. Stove plate for local foundries is being bought at $10.25 per ton, delivered on a $2.02 per ton freight rate, and $10.50 per ton, delivered on a $1.89 per ton freight rate.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$9.00 to $9.85
Heavy melting steel (yard)	6.00 to 6.25
No. 1 hvy. breakable cast	10.50 to 11.00
Stove plate (steel works)	6.75 to 7.25
Locomotive grate bars	6.75 to 7.25
Machine shop turnings	6.00 to 6.50
Short shoveling turnings	6.00 to 6.50
Cast borings (blast furn. or steel works)	6.00 to 6.50
Mixed borings and turnings	6.00 to 6.50
Steel car axles	13.50 to 14.00
Iron car axles	23.50 to 24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25 to 8.75
Forge fire	6.50 to 6.75
No. 1 railroad wrought	9.00 to 9.50
No. 1 yard wrot., long	7.50 to 8.00
Rails for rolling	10.00 to 10.50
Cast iron carwheels	11.00 to 11.50
Stove plate (foundry)	8.25 to 8.75
Malleable cast (railroad)	10.00
Cast borings (chemical)	10.75 to 11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast	$14.00 to $15.00
No. 1 hvy. cast (columns bldg. materials, etc.), cupola size	12.00 to 13.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to 12.50

Philadelphia

New Bar, Plate and Shape Prices Not Yet Fully Established —Large Basic Iron Inquiry

PHILADELPHIA, July 24.—The advance of $1 a ton on plates, shapes and bars for this quarter has not yet been fully established. On small orders for prompt shipment, plates are bringing 2.05c., Coatesville, and bars 1.90c., Pittsburgh, but with contracts for this quarter at prices $1 a ton lower and some extensions of second quarter contracts, desirable new business is still being placed at the old quotations, particularly in the case of preferred buyers, such as large fabricators and distributers. Shape prices continue depressed, with competition keen among eastern Pennsylvania producers. Delivered prices range from 2.06c. to 2.13c. per lb., Philadelphia, and the minimum quotation, which is quoted on delivery from Pencoyd, Pa., is reported slightly firmer than was the case recently, when as low as 2.01c., Philadelphia, was quoted on desirable orders. Sheet prices are unchanged, but concessions of $1 a ton are apparently becoming less common, except to preferred buyers such as jobbers and the automobile body builders.

Mill operations in eastern Pennsylvania continue at a good rate in most cases. On the basis of the volume of business that has been coming in during July, most mills estimate that the month will compare favorably with March and April, the best months in the first half of the year. The leading eastern Pennsylvania interest has already booked more bar business this month than in April and at the present rate the total may exceed the March tonnage.

Pig Iron.—No concessions from $19.50 per ton, base furnace, are reported to have been made on sales of the foundry grade, but at present no sizable tonnages are under consideration, so that a real test of the market has not been provided. Reduction of the freight rate from Buffalo to Philadelphia and nearby points from $4.91 to $4.66, effective until September, is not expected by sellers here to have much influence on the market, as the difference is small and the period short. The American Radiator Co. closed on 200 tons of foundry iron for its Gloucester, N. J., plant. Low phosphorus iron has been in fair demand, the Standard Steel Works Co., Burnham, Pa., having closed on about 3000 tons of the copper-bearing grade. Other consumers have purchased lots ranging from 200 to 500 tons. The Worth Steel Co. has bought 2000 to 2500 tons of basic and the Lukens Steel Co. is expected to place about 20,000 tons within the next week. Prices on this grade range from $19 to $19.25 per ton, delivered.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76
East. Pa. No. 1X	21.26
Basic (del'd east. Pa.)	$19.00 to $19.25
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Ferromanganese. — Consumers are apparently well covered for the second half and their contracts seem to be sufficient for current requirements as only occasional carload lots of new business are coming out. The price continues at $105 per ton, seaboard.

Bars.—Mills are seeking to establish 1.90c., Pittsburgh, or 2.24c., delivered Philadelphia, on all new business, but with contracts outstanding for this quarter and extensions of second quarter contracts at 1.85c., Pittsburgh, desirable business is still being placed at the lower price. Demand for bars is good. A large eastern Pennsylvania interest has booked tonnage in July in excess of that in April and at the present rate may exceed its March total, the largest in the first half.

Shapes. — Fabricators are well booked with contracts, but fabricated steel prices continue at a low level. Mill quotations on shapes range from 2.06c. to 2.13c. per lb., delivered Philadelphia, the lower price being on the basis of 2c. per lb., Pencoyd, Pa. Only the smaller lots of material for prompt shipment bring 2c. per lb., Bethlehem, or 2.13c., Philadelphia, but lower than 2c., Pencoyd, is less common than a few weeks ago.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, ⅛-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.60c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 3.00c.
Cold-fin. steel, rounds and hex.	3.35c.
Cold-fin. steel, sq. and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 to ⅛-in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅛-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Plates.—The volume of orders has increased, so that there is a good total tonnage moving, but individual purchases are small and usually for prompt shipment. On such business 2.05c., Coatesville, or 2.15c., Philadelphia, is not uncommon, but desirable specifications still bring out 2c., Coatesville, or 2.10c., Philadelphia.

Sheets.—A decided effort to stiffen prices on blue annealed, black and galvanized sheets is evident. Blue annealed sheets are 2c., Pittsburgh, or 2.32c., Philadelphia, but preferred buyers apparently can obtain some concession from this price. Black sheets are quoted at 2.65c., Pittsburgh, or 2.97c., Philadelphia, but 2.60c., Pittsburgh, has been done, such concessions being in most cases to distributers rather than consumers. Galvanized sheets are fairly firm at 3.50c., Pittsburgh, or 3.82c., Philadelphia, and concessions of $1 a ton or more are only occasional.

Warehouse Business.—A larger tonnage of material is moving from stock than in June and prices are reported to be much firmer, with quantity differentials strictly maintained. While July business is not expected to be so large as that in March or April, it probably will exceed the total for June.

Old Material.—Prices of all grades still show a tendency to weakness. Buying is light. A consumer at Harrisburg, Pa., has closed on yard grade of heavy melting steel at $10.50 per ton, delivered, and machine shop turnings have brought $10.25 per ton, delivered, on a recent sale to a Phoenixville, Pa., consumer. Dealers report a slightly smaller volume of scrap coming into the market and are inclined to hold available material for higher prices, but the supply is apparently more than sufficient for present consuming requirements.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	$13.00
Scrap T rails	12.50
No. 2 heavy melting steel.	10.50 to 11.00
No. 1 railroad wrought	13.50 to 14.50
Bundled sheets (for steel works)	9.50 to 10.00
Machine shop turnings (for steel works)	10.00 to 10.25
Heavy axle turnings (or equiv.)	12.00 to 13.00
Cast borings (for steel works and roll. mill)	10.00 to 10.50
Heavy breakable cast (for steel works)	14.00 to 15.00
Railroad grate bars	11.00 to 11.50
Stove plate (for steel works)	10.50 to 11.00
No. 1 low phos., hvy., 0.04% and under	17.50 to 18.00
Couplers and knuckles	14.50 to 15.00
Rolled steel wheels	14.50 to 15.00
No. 1 blast f'nace scrap	9.50 to 10.00
Wrot. iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting	16.50 to 17.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00
Cast iron carwheels	15.50
No. 1 cast	15.50 to 16.00
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling	14.50 to 15.00

Cleveland

Firmer Tone in Plates, Shapes and Bars as Business Gains—Automotive Demand Continues Good

CLEVELAND, July 24.—The volume of business in steel bars, shapes and plates gained somewhat the past week. The number of orders was large, but the average size was small, as consumers are ordering only for early needs. The tonnage entered is heavier than in July last year and this month is slightly ahead of June. The market shows a slightly firmer tone, following efforts by leading producers to get prices on a higher basis. The announcement of a $2 a ton advance to 2c., Pittsburgh, for the fourth quarter apparently has had some sentimental effect on the current price situation. However, large consumers have been able to contract at 1.85c., Pittsburgh, for steel bars, shapes and plates for the current quarter.

On new business mills are now holding rather firmly to 1.90c., Pittsburgh, for shapes, but 1.85c. can still be done on steel bars. Plates, the weakest of the three items, are still commonly quoted at 1.85c., Pittsburgh. The local mill base on steel bars is unchanged at 1.85c., Cleveland.

Demand for steel from the automotive industry continues unusually good. While the seasonal lull is reflected by reduced production by some of the motor car builders, this is partially offset by the increased output by some other car makers, who have brought out new models. Activity in the building field has slowed down, but fabricators are making efforts to secure better prices than have prevailed for some time. The Lake shipbuilding industry shows no life.

Pig Iron.—Sales are holding up well in some sections, although there is not much activity in the immediate Cleveland territory and in Michigan. Orders booked by Cleveland interests during the week aggregated 26,000 tons, all in foundry and malleable iron. While this included quite a few contracts for the third quarter, many foundries are buying from hand to mouth. Shipments continue very good, being fully equal to those in June, the latter month not showing up quite as well as May. Shipments of most producers are slightly in excess of production. Prices are holding closely to recent levels. While one local producer claims to be adhering to $16.50 for foundry and malleable grades, Cleveland iron is being offered at $16.25 for delivery to northern Ohio points and evidently can still be had at $16 for shipment to competitive points in southern Ohio and Indiana. One Lake furnace interest is holding to a $16.75 minimum. In Michigan, the market is firm at $17.50 and Lake furnaces are able to get $18 for shipment to some points.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$18.00
S'th'n fdy., sil. 1.75 to 2.25	21 50
Malleable	18.00
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	16.00
Stand. low phos., Valley furn.	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—The consumption of Lake Superior ore during June amounted to 4,667,493 tons, or a decrease of 280,275 tons from May. In June last year 4,530,565 tons was used. The amount on hand at furnaces July 1 was 17,912,817 tons. The amount at furnaces and Lake Erie docks on the same date was 22,980,603 tons, compared with 26,972,594 tons on the same date a year ago. Central district furnaces in June consumed 2,305,249 tons, a decrease of 169,076 tons. Lake front furnaces used 2,191,025 tons, a decrease of 81,197 tons. Consumption by all-rail furnaces amounting to 98,375 tons showed a decrease of 24,584 tons. Eastern furnaces used 72,844 tons, a loss of 5418 tons. There were 163 furnaces using Lake ore in blast June 30, decrease of 10 for the month.

Bolts, Nuts and Rivets.—Specifications continue to come out in fair volume. New buying is rather light. Bolt and nut prices are firm. While large rivets are holding fairly steady at $2.90 per 100 lb., a few consumers are still able to get the former $2.75 price.

Sheets.—While orders are not as plentiful as they were a few weeks ago, new demand is fair for this season of the year, although in this immediate territory sales are very slow. A good volume of business is coming from manufacturers of electrical refrigerators and stoves. A Cleveland manufacturer purchased 500 tons for making mail boxes. Weakness is still in evidence in black sheets, on which as low as 2.65c., Valley, is being quoted. A 2.60c. Pittsburgh price is commonly quoted by mills that adhere to a Pittsburgh base. Blue annealed sheets are

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.75c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb	$2.85
No. 9 gal. wire, per 100 lb	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

rather steady at 1.90c., Pittsburgh, and 2c., Valley, as minimum prices. Galvanized sheets appear plentiful at 3.40c., Pittsburgh, and 3.45c., Valley.

Strip Steel.—The demand is low, both in new business and in specifications against contracts. Net prices are being generally quoted on hot strip and these usually figure back to the 1.75c., Pittsburgh, or a lower base on wide material. On cold-rolled strip, 2.65c., Cleveland, is the commonly recognized price for all round-lot users. The usual differential, or 2.90c., is maintained for 1 to 3 tons. Fender stock is firm at 4.10c.

Semi-Finished Steel.—Specifications for sheet bars continue good, but there is virtually no new business, as consumers generally are under contract. The market is represented by a price range of $32 to $33, Cleveland, on sheet bars, billets and slabs, the point of delivery largely determining the price.

Wire Products.—The market is holding fairly steady at the recently reduced mill prices, although there is some irregularity in cement-coated nails. Demand is not very active.

Cold-Finished Steel.—Demand continues fair from the automotive and other consuming industries. The price is firm at 2.15c., Cleveland.

Reinforcing Bars.—Two Cleveland jobs requiring 750 tons have been awarded to a local mill. Union Terminal work requiring 400 tons is still pending. Prices are irregular. Some effort has been made to sell rail steel bars in Cleveland in competition with the product of local mills, but without success. Rail steel bars are quoted at 1.75c., mill.

Warehouse Business.—The usual summer lull is in evidence. Orders for all products are light. Prices are well maintained.

Coke.—The demand for foundry coke has slowed down somewhat this month, this evidently being due to the shutting down of foundries for a week or two at the first of the month. Buying is almost wholly of a hand-to-mouth character. The present price of $7.75, Painesville, for Ohio by-product foundry coke will probably be reestablished for August. Connellsville foundry coke is unchanged at $3.50 to $4.85, ovens.

Old Material.—Prices are slightly lower on heavy melting steel scrap and on compressed bundles. The market has a weak tone. No. 1 heavy melting steel now carries only one price, $13. Dealers so far have been unable to buy at a lower price. There is no new consumer demand. Local mills are taking shipments at about the recent volume and activity is limited to purchases by dealers to fill these orders. Sales to dealers during the week were at quoted prices. There is no local demand for compressed sheet steel and this is going to the Valley district, where $13.75 is being paid. Unusually large August scrap lists have been issued by some of the Michigan automobile companies. These include: Buick, 6000 tons; Chevrolet, 5000 tons; Chrysler, 4000 tons, and Dodge Brothers, 3500 tons.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.00
No. 2 heavy melting steel	$12.25 to 12.50
Compressed sheet steel	12.00 to 12.50
Light bundled sheet stamp'gs	11.50 to 11.75
Drop forge flashings	11.25 to 11.50
Machine shop turnings	7.00 to 7.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 13.75
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops	16.50 to 17.00
Low phos., billet, bloom and slab crops	17.00 to 17.50
Low phos. sheet bar crops	16.50 to 17.00
Low phos. plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	9.00 to 9.25
Mixed bor'gs and short turn'gs	9.00 to 9.25
No. 2 busheling	9.00 to 9.25
Cupola Grades	
No. 1 cast	16.00 to 16.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	16.75 to 17.25
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Water-Cooled Engines for Huge Airplanes

Some of the reasons lying back of the development of the new X-type water-cooled aeronautic engine built by the Packard Motor Car Co. were explained recently by L. M. Woolson, aeronautic and research engineer of the company, at a meeting of the New England section of the Society of Automotive Engineers. The engine, which has 24 cylinders disposed in four longitudinal rows, resembles two V-type engines, one inverted below the other.

Speaking of the desirability of water-cooled aviation engines of the X type, Mr. Woolson said:

"I have heard of three separate projects contemplating the use of 10,000 hp. in a single airplane. I regard such designs as indicative of what we may expect in the future. The designs of these large planes are all of the thick-wing cantilever monoplane type, with cabins and engine rooms inclosed in the wings. The designs include multiple powerplants, in some cases with tractor propellers mounted in front of the leading edge and in other cases with pusher propellers aft of the trailing edge.

"We need airplanes capable of crossing the Atlantic with at least 100 passengers. Such planes will demand powerful engines, and it is inconceivable that the great parasitic resistance of many externally mounted air-cooled power plants can be permitted. Further, the need for convenient access to the engine for minor repairs and adjustments during flight will require that the engines be suitably housed within the wing. This leads naturally to the conclusion that the engines should be water cooled."

The new engine weighs about 1500 lb. and develops approximately 1500 hp. or about 160 hp. per square foot of frontal area. It was used by Lieut. Alford J. Williams in the special Navy racing airplane with which he tried to win the world's speed record. Although it was unsupercharged, it developed 1250 hp. The addition of a supercharger will add about 100 lb. of weight and add 300 hp.

Steel Barrel Production Sets High Record

WASHINGTON, July 20.—Steel barrels to the number of 712,779 were produced in June, against 696,281 in May, according to reports received by the Department of Commerce from 27 companies owning or operating 31 plants. This makes a new high monthly record, as was that of May. The output in June was at the rate of 61.4 per cent of capacity, compared with 59.8 per cent in May. Shipments in June represented 717,496 barrels, against 694,843 in May, and stocks at the ends of the two months numbered 53,868 barrels and 58,585 respectively. Unfilled orders at the end of June for delivery within 30 days were 319,443 barrels, compared with 324,549 barrels at the end of May, while orders for delivery beyond 30 days totaled 840,313 barrels at the end of June, compared with 932,568 at the end of May.

Production of steel barrels during the first half of 1928 totaled 3,708,592, against 3,391,751 for the corresponding period of last year. The gain was 9.3 per cent. Shipments each year were within a small fraction of 1 per cent of the production figures.

Electrical Controller Boxes

A new dinkey controller, which was shown for the first time at the iron and steel convention in Chicago in June, has been brought out by the Electric Controller & Mfg. Co., Cleveland. Among the features of this controller are the following: Ebony asbestos is used in place of slate. Ventilated contacts are raised 9/16 in. from the dial face. Lugs supporting the contacts are attached to the front of the dial and are removable from the front. The contact lug has a single square-head set screw for clamping the lead wire tightly.

The Corrigan, McKinney Steel Co., Cleveland, announces that it has appointed Hickman, Williams & Co., Union Trust Building, Cleveland, its agent for the sale of its Cor-Kin domestic by-product coke.

Cincinnati

Pig Iron Sales Increase—Alabama Price Holds on 2000-Ton Transaction—Scrap Is Weaker

CINCINNATI, July 24.—Pig iron sales in the past week totaled more than 8000 tons and inquiries now before the trade indicate a fair amount of buying during the remainder of the month. The Standard Sanitary Mfg. Co. has purchased 2000 tons of No. 2 Southern foundry iron for its Louisville, Ky., plant, paying $15.50 base Birmingham. This transaction constituted the first real test of Southern prices in the last month. A Hamilton, Ohio, melter has bought 3500 tons of foundry iron from a Lake Erie maker for about $16, base furnace. The Norfolk & Western has placed 700 tons of foundry and malleable iron with a central Ohio producer. A company at Fort Wayne, Ind., is expected to close for 500 tons of foundry. Jackson County silvery furnaces are shipping iron at a normal rate on third quarter contracts. Prices have not changed.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89
So. Ohio malleable	$20.14 to 20.89
Ala. fdy., sil. 1.75 to 2.25	19.19
Ala. fdy., sil. 2.25 to 2.75	19.69
Tenn. fdy., sil. 1.75 to 2.25	19.19
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material. — Buyers are placing third quarter specifications somewhat more freely and prices are showing a tendency toward greater stability. The announcement of producers that quotations on bars, shapes and plates for the last quarter will be 2c., base Pittsburgh, has served to strengthen the schedule of 1.90c. for current business. While there still is a dearth of sizable structural jobs, several fabricators report that the number of small lettings has been sufficient to keep their shops running at a rate approaching normal. The West Virginia Rail Co. will supply 1000 tons of rail steel reinforcing bars for a municipal reservoir at Portsmouth, Ohio, the material to be shipped by water. The largest inquiry is for 300 tons of bars for the Walnut garage, this city. Bar prices are steady, with new billet bars at 1.85c., base Pittsburgh, and rail steel stock at 1.80c., base, mill. Sheet mills have been booking liberal tonnages, so that from the standpoint of unfilled orders the sheet situation is eminently satisfactory, but the depressed price structure is causing anxiety. Blue annealed sheets are fairly firm at 1.90c. to 2c., base Pittsburgh, while black sheets range from 2.65c. to 2.75c. Auto body sheets remain at 4c. Irregularities are principally in galvanized sheets for roofing purposes, which are selling as low as 3.30c., although 3.40c. to 3.50c. is more representative of the market. Buying of wire products has fallen off considerably in the past two weeks. Common wire nails are quoted at $2.55 per keg, Ironton, plus a barge rate for delivery to Ohio River points. For shipment to consumers who must rely upon all-rail delivery, however, the full all-rail rate is applied.

Warehouse Business. — There has been an improvement in sales, which are paralleling those in June. Bars are leading from the standpoint of volume, while the demand for structural steel and for sheets is lagging. Quotations are unchanged.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.75c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap-weld. steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Coke.—Specifications for by-product foundry coke are running slightly behind those in June, while domestic grades also are moving in lessened volume. A beehive coke maker has sold 1500 tons of foundry coke to a consumer in southern Illinois for delivery during the remainder of the year. Prices are unchanged.

Old Material.—The scrap market shows signs of weakness. Many buyers have accumulated liberal stocks and consequently are refusing to consider the purchase of more material. While heavy melting steel is being fairly well maintained at $10.75 to $11.25, cast iron grades, sheet clips and bundled sheets have declined 25c. a ton. Agricultural malleable has dropped 50c. a ton.

Foundry coke prices per net ton deliv'd Cincinnati: By-prod. coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$10.75 to $11.25
Scrap rails for melting	10.75 to 11.25
Loose sheet clippings	8.00 to 8.50
Bundled sheets	9.00 to 9.50
Cast iron borings	7.25 to 7.75
Machine shop turnings	6.75 to 7.25
No. 1 busheling	10.00 to 10.50
No. 2 busheling	6.00 to 6.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels	11.00 to 11.50
No. 1 machinery cast	15.00 to 15.50
No. 1 railroad cast	12.75 to 13.25
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	11.50 to 12.00
Agricultural malleable	10.50 to 11.00

Birmingham

Pig Iron Shipments Increase—Steel Prices Firmer—Scrap Market Continues Dull and Weak

BIRMINGHAM, July 24.—Pig iron sales during the past week were moderate, but there is a little less tendency on the part of some melters to defer purchases until the iron actually is needed. Stove foundry buying has improved. The probable iron make for August is largely under contract. Shipments have increased some in the last few days. Furnace interests are predicting a good improvement in the market within the next few weeks. Quotations remain at $15.50 for No. 2 foundry iron. The Tennessee company has changed its No. 2 Bessemer furnace from foundry to recarburizing iron. All six of the Ensley furnaces of the company are on basic iron. Seventeen furnaces are in operation; of this number eight are on foundry, seven on basic, one on recarburizing iron and one on ferro-manganese.

Prices per gross ton f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$15.50
No. 1 fdy., 2.25 to 2.75 sil.	16.00
Basic	$15.00 to 16.00

Finished Steel.—Inquiries last week were the heaviest for any week this month. Bookings of bars, plates, shapes and some other lines are ahead of those of two months ago. Mill operations were increased last week, following a slight let up in the previous week. Prices are unchanged but show more firmness than for some time. Structural steel fabricators and reinforcing bar manufacturers are fairly busy. The Ingalls Iron Works Co. has an order for 510 tons for a new power house at Tuscaloosa for the Gulf States Paper Corporation. The Tennessee company is again operating six open-hearth furnaces at Ensley, following a shutdown of a few days. Six are also in operation at Fairfield. The Gulf States Steel Co. continues with three at Alabama City.

Cast Iron Pipe.—Pressure pipe makers have experienced another quiet week in sales. The National Cast Iron Pipe Co. has an order for 250 tons for Grosse Isle, Mich., and the American Cast Iron Pipe Co. will make shipments of 100 tons each to Burbank, Cal., and Waukesha, Wis.

All new business up for figures lately has been in small tonnages. Shipments are going forward at a good rate. Quotations are unchanged from a base of $34 to $35 on 6-in. and larger sizes.

Coke.—The coke situation shows little change. Spot sales are being made from day to day, but the volume is not large. Quotations continue at $5 for both spot and contract.

Old Material. — The market continues dormant. A few sales are being made in small tonnages. Owing to the lack of activity, prices have undergone very little change. Scrap steel rail and No. 1 cast are the main items in demand.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$8.50 to	$9.00
Scrap steel rails	11.00 to	11.50
Short shoveling turnings	7.50 to	8.00
Cast iron borings		8.00
Stove plate		13.50
Steel axles	19.00 to	20.00
Iron axles	20.00 to	21.00
No. 1 railroad wrought	10.00 to	10.50
Rails for rolling		13.00
No. 1 cast		14.25
Tramcar wheels	12.50 to	13.50
Cast iron carwheels	12.00 to	13.00
Cast iron borings, chem.	13.50 to	14.00

Buffalo

Heavy Pig Iron Shipments by Barge Canal—July Sales Exceed Expectations—Scrap Market Easier

BUFFALO, July 24.—July sales of pig iron have exceeded predictions by a substantial margin. Most business has been in lots of less than 1000 tons, but the aggregate of the many small orders has kept the month's output moving steadily. Canal shipments have been heavy and more tonnage is offered to barge operators for August. One 1000-ton lot was sold down State last week. Buffalo prices are a shade stronger; $17 is the district price on low silicon foundry and $17.50 on malleable. A maximum shading of 50c. in each case is said to be the lowest quotation. Operation is unchanged.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$17.00
No. 2X fdy., sil. 2.25 to 2.75	17.50
No. 1X fdy., sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	$16.50 to 17.00
Lake Superior charcoal	27.28

Finished Steel.—Steel mill operations, which were reduced during the first half of July, show an increase for the last half of the month, now running a little better than 75 per cent of capacity. Forward bookings are fair in some lines, particularly for full finished sheets and structural shapes, but in other lines shipments are about equal to orders. The day-to-day volume of business is taking full production of mills in the territory. Bethlehem Steel Co. has started production of nearly 7000 tons of structural for the new Rand Building here, and its subsidiary will fabricate the tonnage. Reinforcing bar sales have been good this month, with the price a little lower and occasionally touching 1.90c., Buffalo. Bar demand is fair. Wire is quieter after two very good months, but operation of mills is on the old scale. Sheet prices are a little steadier, with dips below 2.70c. on black less frequent.

Old Material.—Two Buffalo jobbers are reported as having sold 20,000 tons of No. 1 heavy melting steel for district delivery at $13.75. This is 50c. under the last sale to the same buyer. There is large tonnage of heavy melting steel still to be shipped on old contracts, with other mills at $14.25 to $14.50, as shipments have been stopped by some of these buyers and restricted by others. Dealers are inclined to revamp their entire price list in line with the lower price on heavy melting steel, but have not made actual sales at the new quotations. Other material has not been sold in tonnage during the week.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$13.50 to	$14.00
No. 2 heavy melting steel	12.00 to	12.50
Scrap rails	13.00 to	13.50
Hydraulic comp. sheets	12.00 to	12.50
Hand bundled sheets	8.00 to	8.50
Drop forge flashings	12.00 to	12.50
No. 1 busheling	12.00 to	12.50
Hvy. steel axle turnings	12.00 to	12.50
Machine shop turnings	7.00 to	7.50
Acid Open-Hearth Grades		
R'lr'd knuckles and couplers		15.00
R'lr'd coil and leaf springs	15.00 to	16.00
Rolled steel wheels		15.00
Low phos. billet and bloom ends	16.00 to	16.50
Electric Furnace Grades		
Hvy. steel axle turnings	12.00 to	12.50
Short shov. steel turnings	9.00 to	9.50
Blast Furnace Grades		
Short shov. steel turnings	9.00 to	9.50
Short mixed borings and turnings	9.00 to	9.50
Cast iron borings	9.00 to	9.50
No. 2 busheling	9.00 to	9.25
Rolling Mill Grades		
Steel car axles	15.50 to	16.00
Iron axles	19.50 to	20.00
No. 1 railroad wrought	12.00 to	12.50
Cupola Grades		
No. 1 machinery cast	14.25 to	14.75
Stove plate	13.00 to	13.25
Locomotive grate bars	11.25 to	11.75
Steel rails, 3 ft. and under.		16.50
Cast iron carwheels	12.00 to	12.50
Malleable Grades		
Industrial		15.00
Railroad		15.00
Agricultural		15.00

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struct. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.70c. to 5.05c.
Blue ann'l'd sheets (No. 10)	3.70c.
Com. wire nails, base per keg	$3.65
Black wire, base per 100 lb	3.90

Canada

Toronto Building Takes 10,000 Tons of Steel—Structural Demand Active—Pig Iron Business Steady

TORONTO, ONT., July 24.—While foundry and malleable pig iron sales in the Canadian markets have failed to gain over those of the week preceding, they were much better than those of the first week or 10 days of this month. Business is 10 to 15 per cent better than that of a year ago. Advance buying is practically at a standstill, but inquiries are coming out, and about 1000 tons was sold during the week for delivery up to the end of September. With foundries, sanitary ware and radiator manufacturing concerns and various other pig iron consuming interests operating their plants at between 70 and 100 per cent, prospects are good for a continued demand for foundry and malleable iron for some time to come. Local blast furnace representatives do not look for stronger prices here until those in the United States markets tend to stiffen.

Prices per gross ton:

Delivered Toronto		
No. 1 fdy., sil 2.25 to 2.75	$23.10 to	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.10 to	23.60
Malleable	23.10 to	23.60
Delivered Montreal		
No. 1 fdy., sil. 2.25 to 2.75	24.50 to	25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50 to	25.00
Malleable	24.50 to	25.00
Basic	23.50 to	24.00
Imported Iron, Montreal Warehouse		
Summerlee		33.50
Carron		33.00

Structural Steel.—Canadian building trades are experiencing one of the best years in their history and as a result the demand for steel is also a record one. The Dominion Bridge Co. has received a contract for about 10,000 tons of structural steel for the new building at College and Yonge Streets, Toronto, for the T. Eaton Co.; the

Disher Steel Construction Co. has a contract for 2000 tons of steel for the new Evening Telegram Building, Toronto; contracts for 400 tons for a hotel at Brockville, Ont., and 200 tons for garage for Connaught Motor Sales, Hamilton, Ont., have been awarded. Approximately 2000 tons of structural steel will be required for new factory building on Coxwell Avenue, Toronto, Ont., for Service Station Equipment Co.; 400 tons will be needed for a theater and office building at Outremont, Que., for F. Trudeau.

Old Material.—Business in this market is slow. Consumers are showing interest in immediate needs only. Trading between dealers has dropped off owing to the slump in resale demand, but yards are well supplied for present needs. In the Montreal market dealers report a good demand for wrought iron and steel axles and are offering $22 and $20 per gross ton respectively for these materials, but little is coming out. Other materials are moving slowly. Prices are unchanged at Toronto and Montreal.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$9.00	$7.00
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron	16.00	22.00
No. 1 machinery cast	....	16.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

San Francisco

Steel Demand Well Sustained—Water Line Calls for 4500 Tons of Plates

SAN FRANCISCO, July 21 (*By Air Mail*).—Demand for steel products is well sustained and bookings during the week included some fair-sized tonnages. Among the more important awards were 400 tons of shapes for a chemical plant addition at Tacoma, placed with the Star Iron & Steel Co. and 400 tons of reinforcing bars for highway work in Ventura County, Cal., placed with an unnamed interest. Considerable new work has come up for figures during the past 10 days and the outlook for the rest of the year is good. Structural steel shapes and reinforcing bars continue the most active products.

Pig Iron.—Movement of foundry iron has been confined to unimportant lots and new inquiries involve small tonnages only. Operations among the jobbing foundries continue on a limited scale. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Reinforcing steel bar awards during the past week totaled over 1800 tons and included 400 tons for a warehouse in Seattle for Frederick & Nelson, divided between the Pacific Coast Steel Co. and the Northwest Steel Rolling Mills, and 170 tons for a school administration building in Oakland, placed with the Pacific Coast Steel Co. Bids were opened this week on 2288 tons for a drainage improvement project in Los Angeles and on 300 tons for a department store at Everett, Wash.

Plates.—The plate market on the coast has been exceptionally quiet during the past month and only one inquiry of importance is before the trade for figures. This involves 4500 tons of material for water main transmission lines in Oakland for the East Bay Municipal Utility District. Quotations range from 2.20c. to 2.30c., c.i.f.

Shapes.—Structural steel shapes continue in active demand and awards this week exceeded 1000 tons. The California Steel Co. took 180 tons for an automobile service building in Oakland and the Herrick Iron Works took 170 tons for a bridge over Alameda Creek in Oakland. Bids are being taken on another hangar for the Port Commission in Oakland, involving 250 tons. Pending business totals well over 11,000 tons. Plain material continues firm at 2.35c., c.i.f.

Cast Iron Pipe.—Awards of cast iron pipe this week were heavier than usual and totaled over 3000 tons. Los Angeles placed 844 tons of 8-in. class 350 pipe with the Pacific States Cast Iron Pipe Co., 422 tons of 8-in. class 350 pipe with Jones, Lyman & Co., and 855 tons of 12-in. class 350 pipe with the American Cast Iron Pipe Co. C. H. Merrill, Santa Monica, Cal., took 294 tons of 4 to 12-in. class B pipe for street improvements in Huntington Park, Cal. Pending business is confined to one or two projects totaling less than 1000 tons, with the exception of 22,000 tons for the East Bay Municipal Utility District, bids on which will be opend Aug. 17.

Standard Pipe. — Movement of standard pipe and oil country goods of late has been limited to unimportant lots. Los Angeles opened bids this week on 110 tons of 1-in. galvanized pipe and 75,000 ft. of 1¼-in. galvanized pipe. Inquiries for line pipe involve only small tonnages.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue ann'l'd sheets (No. 10)	3.90c.
Galv. sheets (No. 24)	5.50c.
Struc. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100-lb. keg	3.40

Pacific Northwest

Prices of Plates, Sheets and Wire Products Weaker—Coast Business Quieter

SEATTLE, July 21 (*By Air Mail*).—Developments of the past week indicate that the threatened war in rail and water freight rates from Eastern to Pacific Coast points will soon be terminated. It is understood that the Illinois Central Railroad and the Redwood Lines, which made a rail and water rate of 61c. per 100 lb. from points in Illinois and Indiana to California points, have petitioned the Interstate Commerce Commission for permission to withdraw this rate, and it is very likely it will be granted. Strong pressure from other rail and water lines, with threats that if the low rate was not withdrawn a general war in rates would be started, has had its effect.

Steel business is quiet, with prices showing signs of weakness in practically all lines. This is particularly true of plates, sheets and wire products.

The Alaska salmon pack this year will be the heaviest in any one year since 1926, and this is also true of berries and other fruits. This means a heavy consumption of tin plate on the coast, and greater activity among the can making plants than for several years.

Pig Iron.—Demand is for small lots only, with prices in this territory unchanged. Not enough iron is being sold here to establish a market. No. 2 foundry and Utah basic are quoted at $24 to $25 gross tons, Seattle.

Shapes.—The local market is quiet, but prices seem to be holding. A

Warehouse Prices, f.o.b. Seattle

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Tees, bar sizes	3.50c.
Reinforcing bars	3.00c.
Blue annealed sheets (No. 10)	3.90c.
Black sheets (No. 24)	4.90c.
Galvanized sheets (No. 24)	5.65c.
Rivets, tank	55 & 5% off

bridge at Nisqually was taken by the Pacific Car & Foundry Co. A railroad span at Cle Elum went to an Eastern fabricator. Bids are to be opened on July 27 for about 190 tons for the local Second Avenue extension, and on Aug. 14 for about 700 to 1000 tons of State bridge work. The local Olympic Hotel is to add 400 rooms, and bids will be asked shortly for the steel, the tonnage for which has not been estimated. Shapes are quoted at 2.35c., Seattle.

Plates.—These are the quietest items on the whole steel list. No large contracts have been placed for some time, and no large work is in sight. Tank quality plates are quoted at 2.20c. to 2.25c., but the lower price is not general.

Reinforcing Bars. — Only a fair amount of new work is being placed. The Northwest Rolling Mills, Inc., has taken 150 tons for the local Grimshaw garage, 350 tons for the Benjamin Franklin apartments, also 250 tons of wooden pipe bands. Reinforcing steel bars are quoted at 2.20c. to 3c., Seattle.

Railroad Spikes.—The Pacific Coast Forge Co., Seattle, has taken 2000 kegs of standard spikes for the Great Northern Railway and 1000 kegs for the Northern Pacific. Standard spikes are $2.90 to $3 per 100 lb., Seattle.

Sheets.—Local prices on sheets are weak, and very little new business is coming out. Galvanized sheets, 24 gage, are 4.10c. to 4.15c., No. 24 black are 3.20c. to 3.25c., and No. 10 blue annealed are 2.57c. to 2.67c. at Seattle.

Wire Products.—The local market on wire products is somewhat disturbed and prices are lower, wire nails being about 25c. lower. Wire nails are now obtainable at $3.25 per keg, base, and bright plain wire at $3 per 100 lb., base, at Seattle.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex.	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Boston

6500 Tons of Scrap Being Exported to Italy—Pig Iron Prices Weak

BOSTON, July 24.—The feature of the pig iron market is the weakness of New York State furnace prices. Some Buffalo interests still report a base price of $17 a ton, furnace, but it is evident that no sales of No. 2 plain have been made in New England recently at more than $16.50 a ton, furnace, and there have been numerous sales at $16, while No. 2X has been sold at $16 and $16.50. It is equally certain that other New York State interests are offering and have accepted business within the past 10 days on a delivered basis equivalent to $16.50 a ton, Buffalo, for No. 2X and $17 for No. 1X, for delivery over the remainder of the year. Another feature of the market is that quite a little western Pennsylvania iron is selling at prices higher than the prevailing Buffalo equivalent for delivery on and after Aug. 4, when a new rate, $4.91, equivalent to the Buffalo all-rail freight rate, goes into effect. Eastern Pennsylvania, Virginia and Alabama irons, despite the higher delivered cost, are more in demand by foundries having trouble with mixtures. Sales the past week aggregated slightly better than 4000 tons, of which the Mystic Iron Works took 2200 tons.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$20.91 to	$21.41
*Buffalo, sil. 2.25 to 2.75	21.41 to	21.91
†Buffalo, sil. 1.75 to 2.25	19.78 to	20.28
†Buffalo, sil. 2.25 to 2.75	20.28 to	20.78
East. Penn., sil. 1.75 to 2.25	23.15 to	23.65
East. Penn., sil. 2.25 to 2.75	23.65 to	24.15
Va., sil. 1.75 to 2.25		25.71
Va., sil. 2.25 to 2.75		26.21
Ala., sil. 1.75 to 2.25	22.41 to	24.27
Ala., sil. 2.25 to 2.75	22.91 to	24.77

Freight rates: $4.91 all rail and $3.78 rail and water from Buffalo; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.
*All rail rate. †Rail and water rate.

Coke.—Indications are the New England Coal & Coke Co. and the Providence Gas Co. will make no change Aug. 1 in their price on by-product foundry coke, which is $11 a ton, delivered within a $3.10 freight rate zone. Both companies report July shipments will be better than those of last July, but below the average for a period of years. Most of the New England foundries continue to order in small tonnages, but are ordering more often, indicating some improvement in the melt of iron.

Shapes and Plates.—The fabricated steel situation remains in a firm position. Most fabricators have sufficient business on their books to maintain present operations for several months, and indications are that sufficient tonnage will be available this fall to carry them into the first quarter of 1929. The market for standard shapes and plates is 1.90c., base Pittsburgh, but some of the largest consumers are still protected on third quarter business at 1.85c.

Cast Iron Pipe.—Lynn, Mass., has awarded 250 tons of 6-in. and 8-in. pipe to the Warren Foundry & Pipe Co, Lowell, Mass., closed bids July 23 on 100 tons of 12-in. pipe. No other open municipal business is reported. Private bookings of tonnages are good for this time of the year. Prices on small pipe are firm, but on large diamters prices are easy. The range for 4-in. pipe is $45.10 to $46.10 a ton, delivered common Boston freight rate points, and for 6-in. to 12-in, $41.10 to $42.10. The usual $5 differential is asked on class A and gas pipe.

Warehouse Business. — As July draws to a close, some seasonal falling off in the movement of iron and steel out of warehouses is reported. Business, however, continues ahead of last year. The last advance by mills in prices of bars, shapes and plates has checked warehouse price cutting. There is some talk of a possible advance in warehouse prices before the close of this quarter.

Old Material.—Quotations here for old material tend downward because of the prices steel mills are willing to pay. Shafting, T and girder rails, cast iron borings for steel mill use and railroad wrought are actually lower, while inside prices are paid more often than outside prices for other kinds of scrap. Local dealers report difficulty in securing material, prices being unattractive to owners. Some long bundled skeleton for New England consumption is moving at $6.50 a ton on cars and for Pennsylvania consumption at $5 to $5.50. One sale of girder rails is reported at $7.10 a ton on cars, but the general range of prices is $7.25 to $7.50. Heavy melting steel is in lighter supply than it has been in months. There is quite a little activity in the local export market. Exporters are paying around $9.25 a ton on dock here for No. 1 steel, and around $8.50 for No. 2 steel. A boat will shortly call here for 3500 to 4000 tons of scrap for shipment to Italy, the first consignment to that country in a long time. The boat's total cargo will be around 6500 tons, 3000 tons to be taken on at another port.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.00 to	$8.50
Scrap T rails	7.50 to	8.00
Scrap girder rails	7.25 to	7.50
No. 1 railroad wrought	8.50 to	9.00
No. 1 yard wrought	7.00 to	7.50
Machine shop turnings	5.00 to	5.50
Cast iron borings (steel works and rolling mill)	5.00 to	5.50
Bundled skeleton, long	6.50 to	7.00
Forge flashings	6.50 to	7.00
Blast furnace borings and turnings	5.00 to	5.50
Forge scrap	5.50 to	6.00
Shafting	11.50 to	12.00
Steel car axles	14.50 to	15.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	7.00 to	7.50
Rails for rolling	9.50 to	10.00
Cast iron borings, chemical	9.50 to	10.00
Prices per gross ton deliv'd consumers' yards:		
Textile cast	$13.50 to	$14.00
No. 1 machinery cast	14.00 to	14.50
No. 2 machinery cast	12.50 to	13.50
Stove plate	10.00 to	10.50
Railroad malleable	13.50 to	14.50

St. Louis

Pig Iron Buying Light as Uncertainty Over Prices Continues—Scrap Market Is Weaker

ST. LOUIS, July 24.—Buying of pig iron continues light. Sales of the St. Louis Gas & Coke Corporation totaled about 2000 tons, the largest lot of which was 400 tons to a St. Louis melter. Most of the business was in carload lots. Melters are demanding immediate shipment, which makers regard as an indication of light stocks and an early resumption of quantity buying. The unsettled price situation is believed to be causing melters to withhold buying except for immediate needs, as they seem to be uncertain whether there will be further price reduction as a result of competition from Lake shippers in the Chicago market. The local maker has made no formal reduction in price, but is meeting all competition.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.00
N'th'n No. 2 fdy., deliv'd St. Louis.	19.66
Southern No. 2 fdy., deliv'd	19.92
Northern malleable, deliv'd	19.66
Northern basic, deliv'd	19.66

Freight rates: 81c. Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel.—The Granite City Steel Co. continues to operate all of its rolling mill units at practically 100 per cent of capacity, except that galvanized sheets are at a rate of about 80 per cent. Tin plate is by far the most active of all products. Tank plate demand shows slight falling off owing to limited lettings of cars and oil storage tanks.

Coke.—The usual July dullness marks the coke market. Dealers have shown only slight interest in taking on fall supplies of domestic grades. The demand for industrial grades in this district is very light. Prices are unchanged.

Old Material.—The old material market is weaker and some items are lower as a result of lack of buying by consumers who are curtailing operations. About the only activity is in rails for rolling, as mills making reinforcing bars are enjoying a satisfactory trade, but even the price of this item is 25c. a ton lower. Heavy melting steel, heavy shoveling steel, No. 2 railroad wrought and cast iron borings are 25c. a ton less than in the preceding week; stove plate is 50c. less. Iron car axles, for which the demand, although small, is greater than the supply, are 25c. a ton higher. Dealers are buying virtually nothing except items needed to fill contracts. Railroad lists include: Chicago, Burlington & Quincy, 5690 tons; Atchison, Topeka & Santa Fe, 4000 tons; Nickel Plate, 950 tons, and Standard Oil Co. of Indiana (Woodriver, Ill.), 100 tons.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel	$10.50 to $11.00
No. 1 locomotive tires	12.00 to 12.50
Heavy shoveling steel	10.50 to 11.00
Miscell. stand.-sec. rails, includ'g frogs, sw'ches and guards, cut apart	12.00 to 12.50
Railroad springs	13.00 to 13.50
Bundled sheets	8.50 to 9.00
No. 2 railroad wrought	10.75 to 11.25
No. 1 busheling	9.25 to 9.75
Cast iron borings	8.25 to 8.75
Iron rails	13.00 to 13.50
Rails for rolling	12.75 to 13.25
Machine shop turnings	6.25 to 6.75
Steel car axles	16.75 to 17.25
Iron car axles	25.75 to 26.25
Wrot. iron bars and trans.	18.00 to 18.50
No. 1 railroad wrought	9.00 to 9.50
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	11.50 to 12.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	13.00 to 13.50
Railroad malleable	11.25 to 11.75
No. 1 railroad cast	13.00 to 13.50
Stove plate	10.50 to 11.00
Agricult. malleable	12.00 to 12.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struct. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galv. sheets (No. 24)	5.25c.
Blue ann'l'd sheets (No. 10)	3.60c.
Black corrug. sheets (No. 24)	4.50c.
Galv. corrug. sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	70
Less than 100 lb	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Youngstown

Steel Makers Encouraged by July Developments—Strip and Tin Plate Capacity Very Active

YOUNGSTOWN, July 24.—Continued favorable reports feature the iron and steel market situation in northeastern Ohio. The Republic Iron & Steel Co. has advanced its average production in the Youngstown district to 80 per cent by reason of the near-capacity operating rate of its Warren plant, which produces sheets, strips and tin plate. In this area strip and tin plate capacity is active, averaging above 90 per cent. Makers of full-finished automobile sheets are obliged to work extra turns because of sustained demands from the automobile trade and reduction in output, caused by excessive humidity. Open-hearth furnace schedules have gained to 39, an increase of one from last week. There is a temporary loss this week of two pipe mills, with 12 of 20 under power, but new business now going through sales departments will produce an increase in such scheduling.

Steel makers in this area are encouraged by developments of recent weeks and look for maintenance of production at the current rate or close thereto through the summer months. During the past two weeks there has been some curtailment in output of hot mills because of the intense humidity.

It is expected that the price structure will strengthen in the fall, as the general business situation improves. In the meantime, the market in flat-rolled steel is irregular, especially in steel sheets, with minimum prices at 2.60 to 2.65c for black sheets; 2c for blue annealed and 3.50c for galvanized, base gages. New business is being taken in merchant steel bars and plates at 1.85c per lb.

Improvement in line pipe demand within recent weeks constitutes one of the features of the market, with the Republic Iron & Steel Co. and the Sheet & Tube company among the principal beneficiaries. The Republic company is reported to have taken 50 miles of lapweld pipe for a Southwestern company. In addition to the business which has actually been placed, other important inquiries are before the trade and it is expected they will be translated into orders this year.

Less Ore Consumed in June

Iron ore consumed in June is reported by the Lake Superior Iron Ore Association at 4,667,493 gross tons, compared with 4,947,768 tons in May. The decrease of 280,275 tons was nearly 6 per cent. The consumption compares with 4,530,565 tons in June, 1927. Figures represent a total of 271 furnaces, of which 173 were in blast on the last day of May and 163 on the last day of June.

Ore on hand at furnaces on July 1 is reported at 17,912,817 tons. Ore at Lake Erie docks at the same date is given as 5,067,786 tons, making a total available stock of 22,980,603 tons. This compares with 26,972,594 tons of ore on hand July 1, 1927.

Apparent consumption of babbitt metal in June is reported by the Department of Commerce at 4,731,023 lb. This is an increase of 3 per cent over the May total of 4,606,899 lb., but a decrease of 2½ per cent from the 4,854,653 lb. of June, 1927. For the first half-year the total was 28,507,097 lb., a decline of 8½ per cent from the 31,130,692 lb. of last year.

Non-Ferrous Metal Markets

Tin Advances to 48c.—Copper Quiet but Firm—Lead and Zinc Steady—Antimony Weaker

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 24	July 23	July 21	July 20	July 19	July 18
Lake copper, New York	14.75	14.75	14.75	14.75	14.75	14.75
Electrolytic copper, N. Y.*	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.	48.00	47.62½	....	47.45	47.62½	47.37½
Lead, New York	6.20	6.20	6.20	6.20	6.20	6.20
Lead, St. Louis	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York	6.55	6.55	6.55	6.55	6.55	6.55
Zinc, St. Louis	6.20	6.20	6.20	6.20	6.20	6.20

*Refinery quotation; delivered price ¼c. higher.

Copper.—A small amount of buying for spot and August delivery has been done in the past week at unchanged prices, namely 14.75c. per lb., delivered Connecticut Valley, for electrolytic or Lake copper. Consumers are showing almost no interest in supplies for September, a situation not pleasing to the larger producers, who fear a last-minute rush to buy, which in the present firm market might have a tendency to advance prices. Present prices are quite satisfactory to the producers, who prefer a steady rather than an advancing market. Shipments are being made at an undiminished rate both to domestic and foreign users.

Tin.—Although spot tin was sold today at 48c. per lb., an advance of ¾c. in the week since July 17, the strength was more attributable to a stronger market in London and in the Far East than to activity here. Sales in the last calendar week in this market did not exceed 1000 tons, while the total for Monday and today was little more than 600 tons. The stronger situation in London is ascribed to the fact that options on a large tonnage are due in August and September. In the London market the advance in the week has been about £4, and a like advance has occurred in the Singapore price. Today's London prices were £217 10s. for spot standard, £214 10s. for future standard, £220 10s. for spot Straits. The Singapore price today was £219 15s.

Lead.—There is a moderately active demand for lead, with July and August deliveries mainly called for. Some inquiry for September has developed, but not much business has

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	50.00c. to 51.00c.
Tin, bar	52.00c. to 53.00c.
Copper, Lake	15.75c.
Copper, electrolytic	15.50c.
Copper, castings	14.75c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.00c. to 12.50c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commerc'l grade,	30.00c. to 40.00c.
Solder, ½ and ½	32.50c. to 33.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	53.00c.
Tin, bar	57.00c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	8.00c.
Lead, American pig	7.00c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	56.50c.
Solder, ½ and ½	31.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.25c.
Copper, hot rolled	24.00c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Seamless Tubes—	
Brass	24.12½c.
Copper	25.00c.
Brazed Brass Tubes	27.25c.
Brass Rods	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc. sheets, open	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed in more than two months. Zinc sheets have been quoted at 9.25c., base, since June 7, and lead full sheets at 10c. to 10.25c. since May 29.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.25c.
Copper, hot rolled	23.50c.
Zinc	9.25c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	24.12½c.
Copper	25.00c.
Rods—	
High brass	17.00c.
Naval brass	19.75c.
Wire—	
Copper	16.75c.
High brass	19.75c.
Copper in Rolls	22.50c.
Brazed Brass Tubing	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	12.625c.	14.00c.
Copper, hvy. and wire	12.50c.	13.50c.
Copper, light and bottoms	10.75c.	12.00c.
Brass, heavy	7.00c.	8.25c.
Brass, light	6.00c.	7.50c.
Hvy. Machine composition	9.75c.	11.00c.
No. 1 yel. brass turnings	8.75c.	9.50c.
No. 1 red brass or compos. t'ngs	9.00c.	10.00c.
Lead, heavy	5.00c.	5.375c.
Lead, tea	3.75c.	4.25c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.00c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	19.25c.
Copper, hot rolled	23.50c.
Copper, cold rolled, 14 oz. and heavier *	25.75c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.62½c.
Copper	26.50c.
Brazed Brass Tubes	27.25c.
Brass Rods	17.00c.

been closed. The St. Louis price is 6c., with slight premiums being asked in some instances. The New York market continues at 6.20c., which is the contract price of the American Smelting & Refining Co.

Zinc.—For prompt shipment, 6.20c., East St. Louis, is asked for prime Western zinc, but 6.25c. has been paid for August. The market has been rather quiet during the last week. The price of ore at Joplin remains unchanged at $40 per ton. Production last week was 12,000 tons, the same as the week before.

Antimony. — Sales of parcels on dock here brought weakness in the antimony market within the past few days. The market declined to 9.37½c. per lb., New York, duty paid. Futures are freely offered at 9.62½c., duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent, is offered at 23.90c. per lb., delivered.

Nickel.—Ingot nickel is quoted at 35c. per lb., shot nickel at 36c. and electrolytic at 37c.

Non-Ferrous Metals at Chicago

CHICAGO, July 24.—Tin has advanced and lead has declined. There has been considerable business in tin in this country, but the advance in price is attributed largely to speculation in London. Copper and zinc are being bought for nearby delivery only. Old metal prices are unchanged.

Prices, per lb., in carload lots: Lake copper, 14.87½c.; tin, 48.75c.; lead, 6.10c.; zinc, 6.30c.; in less-than-carload lots, antimony, 11.25c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

Menominee Range Meeting

The Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers will meet jointly with the Lake Superior Mining Institute, Sept. 7 and 8. The meeting will be largely social and will include visits to mines and works but a brief technical session will be held.

On the morning of Sept. 7 the party will leave the Crystal Inn, Crystal Falls, Mich., for Alpha and Caspion, visiting mines and meeting for lunch at the Caspion Club. After lunch mines in the vicinity of Iron River will be visited. There will be a barbecue supper at Fortune Lake and a business session of the Lake Superior Mining Institute with a short technical session.

On Sept. 8 the party will meet at Iron Mountain for visit to mines and power plants.

The conduct of the meeting will be in the hands of the Lake Superior Mining Institute, as host, with C. H. Baxter, president, and A. J. Yungbluth, secretary. On arrival the members will be given a specially prepared guide book to the field.

Philadelphia Meeting of Institute of Metals

The Institute of Metals Division (American Institute of Mining and Metallurgical Engineers) will hold its fall meeting at Philadelphia in the same week that the American Society for Steel Treating and the American Welding Society meet. The institute sessions will be held Oct. 9-10-11 at Hotel Benjamin, which will be headquarters.

The program includes the following papers:

Gases in Casting Copper—by O. W. Ellis.

Diffusion of Zinc into Copper—by S. L. Hoyt.

Less Common Elements in the Electrical Industry—by T. S. Fuller.

Papers on temperature coefficient of Brinell measurements and hardenable copper and silver alloys.

Treatment and Structure of Magnesium Alloys—by John A. Gann.

Notes on Smoothing and Etching—by H. B. Pulsifer.

X-Ray Study of Cold Work and Annealing—by Ancel St. John.

Tempering of Steel—by F. F. Lucas.

Neumann Bands in Ferrite—by C. H. Mathewson.

Dr. F. M. Becket, vice-president Union Carbide Co., will speak at the institute's dinner on chromium alloys.

Effect of Cold Rolling and Heat Treatment upon the Physical Properties of Britannic Metal—by B. Egberg and H. B. Smith.

High Strength Gold Alloys for Jewelry—by E. M. Wise. Stability of Aluminum and Magnesium Copper Alloys—by A. J. Lyon.

Papers on Permanent Mold Casting and Vacuum Method for the Casting Metal.

Research Fellowship on Low-Temperature Tar

To determine the composition of tar produced in the low-temperature carbonization of Eastern coals, Kenneth M. Irey, Monmouth, Ill., has been appointed to the National Coal Association research fellowship at the Carnegie Institute of Technology and the United States Bureau of Mines. The work will be along lines similar to those developed by preceding Coal Association fellowships, working on low-temperature tar from a Western coal. It is recognized that the success of low-temperature carbonization of any coal depends upon profitable disposal of the smokeless fuel and the by-products.

Industrial utilization of low-temperature tar cannot be developed without knowledge of its composition. Three successive National Coal Association fellowships working under Dr. R. L. Brown, organic chemist, Bureau of Mines, have succeeded in determining the amount of motor fuel and its character in the coal tar from Utah coal. They have, likewise, worked out the proportion of tar acids and acid resins, which are valuable constituents for timber preservatives.

Results of the 1927 fellowship have shown that considerable percentages of heavy oils and waxes can be isolated from the Utah coal tar. These present interesting possibilities for technical utilization. Due to the present interest in the construction of several large-scale low-temperature carbonization plants in the Eastern United States, it was deemed important to make a similar thorough examination of the composition of low-temperature tar from eastern coals.

Germany Leading Seller of Electrical Machinery

Of the five largest machinery exporting countries, Germany was by far the leader in 1913, according to figures in a recent copy of the London *Economist*. Rapid strides have been made by that country in recent years in overcoming the setback occasioned by the World War, with the result that in 1927 Germany took second position from the United States and exported within 2½ per cent of as much as Great Britain, which recently has stood first. The figures given in the table are in thousands of pounds sterling and show that each of the three leading countries provided about 30 per cent in 1927 of the total exports of the five countries shown.

MACHINERY EXPORTS, IN THOUSANDS OF POUNDS STERLING

	1913	1926	1927
Great Britain...	7,656	18,174	18,800
United States...	5,790	17,600	17,600
Germany	15,888	17,300	18,350
France	2,185	3,880	2,760
Switzerland ...	1,240	2,180	2,850
Total	32,759	59,134	60,360

American ships carried 35 per cent of the exports and 33.2 per cent of the imports entering into our waterborne commerce in 1927, according to a statement of the Department of Commerce. In both cases there was an increase over the proportion carried by American ships in the preceding year, which was 34.6 per cent of the exports and 30.7 per cent of the imports.

Average weekly earnings in New York State factories in January are reported by the Industrial Commissioner at $29.22. With the exception of last November, this is the lowest figure since July. It is 8c. below the average for the 12 months of 1927 and compares with $29.57 in December and $29.52 in January of that year.

PERSONAL

DR. JOHN JOHNSTON, director of research and technology for the United States Steel Corporation; C. A. REINHARDT, chief metallurgist Youngstown Sheet & Tube Co.; DR. J. S. UNGER, manager of the research bureau of the Carnegie Steel Co., and HOMER D. WILLIAMS, president Pittsburgh Steel Co., have been invited by President THOMAS S. BAKER of the Carnegie Institute of Technology, Pittsburgh, to become members of the advisory board of the department of metallurgical engineering at that institution. The board is made up of about 25 steel company executives and metallurgists and is concerned primarily with the development of metallurgical research now carried on jointly by the Carnegie Institute and the Bureau of Mines. T. D. LYNCH, consulting metallurgical engineer for the Westinghouse Electric & Mfg. Co., East Pittsburgh, is chairman of the board for the coming year, and for this period the board has selected a program of five investigations in ferrous metallurgy to be made by research fellows under the auspices of the Institute and the Bureau of Mines. An advisory board of coal mine operators and engineers, which occupies a similar relationship to the department of mining engineering, has selected six problems in fuel chemistry for investigation by six research fellows during the same time.

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W. O. RENKIN has been appointed manager of the industrial furnace department of the Combustion Engineering Corporation, 200 Madison Avenue, New York, and will assume his new duties Aug. 1. He is considered a pioneer in the application of pulverized fuel to metallurgical and industrial furnaces, having devoted the past 15 years to this particular field of engineering.

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MURRAY N. BILLINGS, assistant traffic manager Illinois Steel Co., Chicago, has been appointed traffic manager, succeeding F. T. BENTLEY, who has retired from active service and has been made consultant traffic manager.

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H. V. BARR, formerly associated with the Heald Machine Co., Worcester, Mass., is now Connecticut representative of Stedfast & Roulston, Inc., Boston.

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CHARLES N. TEETOR has been elected president of the Perfect Circle Co., Hagerstown, Ind., following consolidation of that company with the General Piston Ring Co., Tipton, Ind. Other officers of the company are RALPH TEETOR, first vice-president; LOTNAIR TEETOR, second vice-president; LEWIS S. BOWMAN, secretary, and RAY TEETOR, treasurer.

JOHN J. LOUGHRAN has resigned as chief engineer of the Adriance Machine Works, Brooklyn, to become chief engineer at the Pottstown, Pa., plant of the Doehler Die Castings Co.

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HAROLD E. BUTCHER, recently vice-president Champion Spark Plug Co., has been elected second vice-president of the Edward G. Budd Mfg. Co., Philadelphia. This office was recently created by a change in the company's by-laws which were amended at the same time to increase the membership of the board of directors from 12 to 15.

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W. R. STRICKLAND, assistant chief engineer of the Cadillac Motor Car Co., Detroit, was nominated for the presidency of the Society of Automotive Engineers at a meeting held recently in Quebec.

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LAWRENCE M. BRILE, who has been vice-president in charge of sales for the Fairmont Mfg. Co., Fairmont, W. Va., was elected president of the company at a recent board meeting, to succeed W. J. ADAM, who has resigned. DR. ROBERT J. ANDERSON has been elected vice-president and is in charge of production at the company's aluminum rolling mills at Fairmont. JOHN N. BRANZA, who has been manager of the Cleveland office, has been named sales manager and T. A. LYNCH has been appointed assistant to the president. WILLIAM J. LANGE, metallurgist, has been made technical supervisor.

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J. B. HAMILTON, formerly associated with Wickes Brothers, Jersey City, has purchased an interest in and been elected vice-president of the Bertolette Machine Tool Co., Jersey City, dealer in new and used machine tools. The company has established a department to handle air compressors and contractors' equipment.

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JOHN W. DAVIS, JR., Galveston, Tex., has been appointed assistant trade commissioner and assigned to Buenos Aires, Argentina.

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FRANK MESSENGER, Paterson, N. J., has been appointed assistant trade commissioner at London, England.

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SAM TOUR has resigned as metallurgist of the Doehler Die Casting Co., Batavia, N. Y., and has been succeeded by W. G. JOHNSTON.

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HERBERT HOOVER, Republican nominee for President of the United States, has been awarded the Louis Livingston Seaman medal of the American Museum of Safety, New York, awarded for the best record in the saving of life in the field of sanitation and accidents, for "great public service from the standpoint of human values," and particularly for "conspicuous work in the Mississippi flood relief." The latest previous recipient was the late Judge E. H. Gary, in 1922.

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FRED JOHNSON, who has been manager of the St. Louis district sales office of the Wagner Electric Corporation, St. Louis, for 21 years, has been transferred to Los Angeles and is now manager of the company's office in that city. He has been connected with the electrical industry since 1898, having started out in the sales department of the Martin J. Insull Co., Chicago. In 1899 he became associated with the General Incandescent Arc Light Co., New York, and the following year became manager of the Chicago office, retaining this position until he went with the Wagner corporation. He has been succeeded at St. Louis by ALEX L. MILTENBERGER, heretofore the company's Pacific Coast manager, with headquarters at San Francisco. Mr. Miltenberger was graduated from Columbia University in 1909 and has been connected with the Wagner organization ever since, first in the St. Louis sales department and since 1920 as Pacific Coast manager.

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L. E. GRIFFITH, New York district manager for the Riley Stoker Corporation, Worcester, Mass., has been appointed sales manager of the company, succeeding the late WILLIAM PESTEL. Mr. Griffith was graduated from Lafayette College, Easton, Pa., in 1912, and his first business connection was with the Thompson-Starrett Co., first at New York and later at Chicago. After a short affiliation with the Babcock & Wilcox Co., New York, he became identified with the United Machine & Mfg. Co. and was president of that company when it was absorbed by the Riley corporation. W. L. SCHULTZ, for the past few years sales representative in the Riley New York office, has been appointed district manager to succeed Mr. Griffith.

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C. M. RUTLEDGE, for the last nine years identified with the Columbia Tool Steel Co., first as sales representative and later as assistant Chicago district manager, has become associated with the Chicago office of the Vanadium-Alloys Steel Corporation, Latrobe, Pa.

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AVERY C. ADAMS, formerly assistant general sales manager for the Trumbull Steel Co., Warren, Ohio, and more recently associated with the Republic Iron & Steel Co., has been appointed assistant to the president of the General Fireproofing Co., Youngstown.

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W. G. EDMONDSON, recently assistant engineer of motive power of the Reading Co., has been appointed

works manager for the American Abrasive Metals Co., Irvington, N. J.

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J. M. RANKIN, associated with the Bessemer Gas Engine Co., Baltimore, has been transferred to Washington, where the company has opened an engineering sales office.

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J. E. ROWE, who has been director of extension and head of the department of mathematics at the College of William and Mary, Williamsburg, Va., has resigned to become president of the Clarkson Memorial Institute of Technology, Potsdam, N. Y.

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J. W. BARRITT, formerly supervisor of apprentices at the South Philadelphia works of the Westinghouse Electric & Mfg. Co., will open a private engineering school at 1003 Lafayette Avenue, Moore, Pa., on Oct. 1, to be known as the Central Technical Institute.

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WILLIAM F. MERRILL, vice-president and general manager of Remington-Rand, Inc., Buffalo, has been elected president of that company, succeeding JAMES H. RAND, JR., who becomes chairman of the board. B. L. WINCHELL, who was formerly president of the Remington Typewriter Co., has been named chairman of the executive committee. F. W. YOUNGS, continues as general manager of plants, with headquarters at Utica, N. Y.

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F. E. MOSKOVICS, president Stutz Motor Car Co., Indianapolis, and HAROLD C. STROTZ, manager of the F. B. Keech Co., Chicago, have been elected officers of the Faries Mfg. Co., Decatur, Ill., manufacturer of brass, bronze and aluminum castings, spinnings and stampings and plating work, following a reorganization of the company. At that time, W. J. GRADY, president of the company, and associates acquired a large part of the original Faries family holdings, and Mr. Grady was re-elected president; Mr. Moskovics, vice-president; W. W. ELLISON, secretary, and G. S. FOSTER, assistant secretary and assistant treasurer.

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C. C. HENDERSON, vice-president and treasurer Allegheny Steel Co., Breckenridge, Pa., sailed July 15 for Europe to be gone until early in September.

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H. W. GRAHAM, recently appointed general metallurgist in charge of metallurgical, inspection and quality matters for the Jones & Laughlin Steel Corporation, Pittsburgh, has been with that organization since his graduation from Lehigh University in 1914. He started in the cold finishing department at the South Side works, subsequently going to the engineering department and the open-hearth department, and for three years was attached to the Eliza furnaces.

Appoint Secretary-Manager for Gray Iron Institute

At a meeting of the executive committee of the Gray Iron Institute, held in Cleveland, July 17, Arthur J. Tuscany was chosen secretary-manager. The institute was formally launched at a meeting held in Philadelphia, May 18, following a conference of the leaders of the industry, who met in Pittsburgh in March. The executive committee of the institute consists of the president, Walter L. Seelbach, Forest City-Walworth Run Foundries Co., Cleveland; vice-presidents, B. H. Johnson, Cresson-Morris Co., Philadelphia, and A. E. Hageboeck, Frank Foundries Corporation, Moline, Ill.; treasurer, H. S. Chafee, Builders' Iron Foundry, Providence; and John L. Carter, Barlow Foundry Co., Newark, N. J.

A. J. TUSCANY

For the past six years Mr. Tuscany has been secretary-manager of the Ohio State Foundrymen's Association. Previous to that time he was treasurer, director of purchases and a member of the board of the Whitney Tractor Co., Cleveland. He joined the latter organization at the time of its consolidation with the Post Tractor Co., for which organization he had been sales manager and a director. He achieved his early experience with the Johns-Manville Co., first as secretary to the branch manager and later as purchasing officer, salesman and field manager.

Ottawa Sands Corporation, recently organized with $500,000 capital stock as a division of Material Service Corporation, Conway Building, Chicago, is building a large steel molding sand plant at Ottawa, Ill. The new company will have a daily capacity of 45 cars when it starts operations. Henry Crown, president, Material Service Corporation, also heads the new company. A. B. Hewson, formerly vice-president, Ottawa Silica Molding Sand Co., will be in charge of sales for the new corporation. Sales agencies will be appointed in various parts of the country.

Ohio Foundrymen Meet Aug. 16 and 17

The annual convention of the Ohio State Foundrymen's Association will be held at Cedar Point, Ohio, Aug. 16 and 17. The program as so far arranged is as follows:

"The Required Foundry Knowledge on Foundry Sand," by H. W. Dietert, chief industrial research engineer, United States Radiator Corporation, Detroit.

"Merchandising Foundry Products," name of speaker not announced.

"Taxation and Public Expenditures and Their Relation to Ohio Business," by George B. Chandler, secretary Ohio Chamber of Commerce, Columbus.

"How the Industrial Insurance Rates Affect the Industry and the Individual Employer," by T. M. Merriman, Columbus.

"What You Should Know About Industrial Claims," by H. P. Sutherly, Columbus.

"A Safety Program for Ohio Foundries," by Fred G. Lange, division of safety and hygiene, Industrial Commission of Ohio.

Increase in Boiler Orders

New orders for 1609 steel boilers, with 1,467,281 sq. ft. of heating surface, were placed in June, as reported to the Department of Commerce by 72 manufacturers. This is the highest total for several months. It compares with 1571 boilers and 1,456,278 sq. ft. in May and with 1542 boilers and 1,366,486 sq. ft. in June, 1927.

For the first half-year the total was 7780 boilers and 7,592,628 sq. ft. of heating surface, comparing with 8042 units and 8,272,957 sq. ft. last year. The decline, based on square feet, was 8¼ per cent.

David Lupton's Sons Co. Building Chicago Plant

Construction work is proceeding on the first unit of the new Chicago plant of the David Lupton's Sons Co., Philadelphia, manufacturer of steel windows. The first unit will be 150 x 500 ft. When other units are built the Chicago plant will be 500 x 1000 ft. The Chicago plant will include a fabricating shop and warehouse, giving the company two branches in addition to the main plant and warehouse in Philadelphia, the other plant being in Cleveland.

More than two-thirds of the American cutlery exports in 1927 consisted of safety razor blades, according to the Department of Commerce. Total shipments of blades made $7,020,995, of $10,232,632 total cutlery exports. The total showed a gain of 9 per cent over 1926, while safety razor blades gained 19 per cent.

OBITUARY

JUSTIN DAVID CROSBY, founder, president and treasurer of the J. D. Crosby Co., Pawtucket, R. I., whose death in that city on July 10 was mentioned in THE IRON AGE last week, had spent his entire business life in the steel and wire industry. He was born at Worcester, Mass., in 1862 and, after attending high school and business college in that city, he

J. D. CROSBY

was employed as a clerk in the plant of the Washburn Woven Wire Mfg. Co., with which company his father was associated at the time. He was identified with the Washburn organization for 23 years, serving in nearly every department and finally becoming superintendent. Upon leaving the company he was engaged in business on his own account for a short time. Later he became superintendent of the Carpenter Steel Co., Reading, Pa., and afterward served in a similar capacity at the Jersey City plant of the Crucible Steel Co. of America. He founded the Pawtucket company bearing his own name in 1910 and remained its active head until his death. He had been prominent in the civic and industrial life of his city and State, having served as president of the Pawtucket Chamber of Commerce and also having been a member of the New England Council, which has been active in promoting the business interests of the New England States.

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ARTHUR E. DANFORTH, a director of Oglebay, Norton & Co., Cleveland, and for the past 15 years affiliated with the sales organization of that company, died July 18, aged 43 years. He had been connected with the company for 24 years. His sales work in the firm's iron ore business brought him in close contact with the iron and steel industry, in which he had a wide acquaintance. Mr. Danforth was born in 1884 and attended the East Cleveland schools and Oberlin College.

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JOHN MAXWELL, president Maxwell Steel Vault Co., Oneida, N. Y., died at his home in that city on July 19, following a stroke of apoplexy. He was 83 years of age, but had been active until his death in the company, which he had founded in 1904.

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WILLIAM T. KENNEDY, until his retirement two years ago superintendent of the Watertown, N. Y., foundry of the New York Air Brake Co., died at his home in that city on July 16, aged 65 years.

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CHARLES WALTZ, editor of the *Iron, Bronze and Wire News*, Cincinnati, died at Dolgeville, N. Y., on July 18, as the result of injuries sustained in an automobile accident at Caroga Lake, N. Y. He was commissioner of the Ornamental Iron and Bronze Manufacturers Association.

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DR. JAMES EDGAR DENTON, professor emeritus of mechanical engineering at the Stevens Institute of Technology, Hoboken, N. J., died on July 22 at Maplewood, N. J., aged 73 years. He was born at Piermont, N. Y., and after graduation from Stevens in 1875 he served for a time as an instructor. He became professor of experimental mechanics in 1886 and professor of mechanical engineering and shop practice in 1898. From 1882 until 1886 he was engaged in the manufacture of rock drilling machinery.

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DAVID T. ADAMS, pioneer of the Minnesota iron mines, died in Chicago, July 22, aged 69 years. In the fall of 1883 he discovered the Mesabi Range, and he was one of the earliest mining men on the Cuyuna Range. The Adams mine, named for him, and the Fayal mine, which he also discovered, are now properties of the United States Steel Corporation. At the time of his death he still owned mining properties that were leased to operating companies. He was born at Rockford, Ill.

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THOMAS G. SMALLWOOD, during the past 14 years district manager at Cincinnati for the Chicago Pneumatic Tool Co., died July 20 after a lingering illness. He was 65 years of age.

Canadian Automobile Output Smaller

WASHINGTON, July 23.—June production of automobiles in Canada, as reported to the Department of Commerce by the Dominion Bureau of Statistics, was as follows: Passenger cars, 25,341; trucks, 3058. This compares with 29,764 passenger cars and 4178 trucks in May and with 16,470 passenger cars and 2738 trucks in June, 1927.

Smaller Orders for Steel Furniture

WASHINGTON, July 24.—Orders for steel furniture in the business group in June were valued at $2,763,900, compared with $3,085,365 in May, according to reports received by the Department of Commerce from 33 manufacturers. Orders in the shelving group in June were valued at $737,060, against $732,921 in May.

Shipments of steel furniture in the business group last month were valued at $3,009,054, compared with $3,213,018 in May, while unfilled orders were valued at $1,992,665 on June 30 and $2,232,594 on May 31. Shipments of shelving furniture in June were valued at $720,253, against $768,562 in May, while unfilled orders at the end of June were valued at $729,310, compared with $752,512 at the end of May.

For the six months ended June 30 orders for steel furniture in the business group were valued at $18,591,964, against $16,181,697 for the corresponding period of last year. The gain was 15 per cent. Orders for shelving furniture in the first half-year were valued at $4,561,795, against $3,870,691 for the corresponding period of 1927. Here the increase was nearly 18 per cent.

Heavy Sheet Sales in June

Sales of sheet steel showed a sharp gain in June, being 318,902 tons or 68,586 tons over the previous month and larger than any previous month of the year except during March, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers, Cleveland. Production, which was 311,629 tons, fell off considerably, being the smallest of any month of the year, and shipments also declined, but to a less extent. Shipments were 308,741 tons or 3000 tons less than production. May shipments were 326,324 tons. Unfilled orders on July 1 amounted to 526,798 tons or about 1000 tons less than on May 1. The June report and comparisons follow:

	June	May	April
Total number of mills	721	721	721
Capacity per month	471,350	506,000	464,422
Percentage reporting	70.1	72.2	72.2
Sales	318,902	250,316	284,070
Production	311,629	349,367	327,909
Shipments	308,741	326,324	327,674
Unfilled orders	526,798	527,477	571,761
Unshipped orders	100,904	112,664	109,200
Unsold stocks	50,702	54,047	53,853
Percentages of Capacity			
Sales	96.5	68.5	84.7
Production	94.3	95.6	97.8
Shipments	93.4	89.3	97.7
Unfilled orders	159.4	170.4	170.4
Unshipped orders	30.5	30.8	32.6
Unsold stocks	15.3	14.8	16.0

Machinery Markets and News of the Works

July Sales Holding Up Well

Wright Aeronautical Corporation, General Electric Co. and Implement and Tractor Companies Are Large Buyers —Miscellaneous Demand in Good Volume

MACHINE tool buying is holding at a high rate for July and the total for the month, it is now assured, will fall little, if any, short of that in June. The past week has been featured by large buying by the Wright Aeronautical Corporation and the General Electric Co.

It is estimated in the trade that the expenditures of the Wright Aeronautical Corporation for equipping a new unit of its plant at Paterson, N. J., will total $500,000 or more. The General Electric Co. is buying heavily for its refrigerator departments at the Schenectady and Erie plants. Twenty large presses were among its purchases.

At Chicago, orders from the implement and tractor industry continue to make up a goodly proportion of current business. It is estimated that the J. I. Case Threshing Machine Co. and the John Deere Tractor Co. have each spent $225,000 for machine tools since the first of the year, and other farm equipment manufacturers have also been steady buyers. The Ludlow Typograph Co., Chicago, has bought about $15,000 worth of tools.

The present healthy demand for machine tools has greater significance from the fact that neither the railroads nor the automobile companies, which normally contribute a good share of such business, are important buyers. Automobile parts manufacturers are buying some machinery, but there is little demand from the Michigan automobile manufacturers. Railroad buying is almost negligible.

New York

NEW YORK, July 24.—Orders from the Wright Aeronautical Corporation, Paterson, N. J., which have been distributed among a number of sellers, have helped materially in raising July sales records to a point which will make the month compare fairly well with June. Moreover, July this year will run considerably ahead of the same month last year. Purchases of the Wright company, it is stated in the trade, will total $500,000 or more. The General Electric Co. still has requirements to be covered for its refrigerating machinery department, but has not been buying so actively in the last week. Scattered orders for tools are in fairly good volume. A notable exception is in the railroad field, where the demand is exceedingly quiet.

Included in the week's sales of the Niles-Bement-Pond Co. were a 90-in. journal turning lathe, a 3500-lb. double-frame steam hammer and an 18-in. slotter. This company also sold on the Pacific Coast three Brown & Sharpe machines. The Pratt & Whitney division sold a duplex hobbing machine, a 13 x 30-in. and a 16 x 36-in. lathe, two No. 3 universal bench milling machines, three No. 1 9½-in. deep-hole drilling machines, a No. 1 13-ft. deep-hole driller, a 6-in. and a 12-in. vertical shaper, two No. 2 jig boring machines, a bench lathe and a Sigourney drilling machine.

Bids are being asked by Department of Mental Hygiene, Capitol Building, Albany, N. Y., Lewis M. Farrington, secretary, until Aug. 1 for two double-end steel Diesel electric ferryboats, and until Aug. 15 for complete machinery for the two ferryboats for Manhattan State Hospital, Wards Island, New York. Plans and specifications at office noted and at office of Department of Public Works, Division of Architecture, Flatiron Building, New York, and 353 Broadway, Albany.

Elevating machinery, conveying equipment, factory trucks and tractors, and other handling equipment will be installed in ten-story warehouse and distributing building to be erected by Lehigh Valley Railroad Co., 143 Liberty Street, New York, at Gerard Avenue and 144th Street, to cost approximately $1,000,000. E. E. Loomis is chief engineer.

Brooklyn Parking Terminal, Inc., 250 Park Avenue, New York, has filed plans for a six-story automobile service, repair and garage building to cost $300,000 with equipment. J. B. Peterkin, 285 Madison Avenue, New York, is architect.

Mitchell-Vance Co., 503 West Twenty-fourth Street, New York, manufacturer of lighting fixtures, has leased space in building at 70 Washington Street, Brooklyn, and will remove to that location.

Superintendent of Lighthouses, Staten Island, N. Y., will receive bids until Aug. 6 for 74 pieces cast steel stud link lightship chain, 130 cast steel shackles, and 75 cast steel swivels for lightship chain, proposal 27574; until Aug. 8 for wrought iron stud link lightship chain, open link wrought iron buoy chain in 15-fathom lengths, bridle chains for bell buoys, iron buoy swivels, split key steel buoy shackles, riveted pin steel buoy shackles, and cast steel mushroom anchors, proposal 27599.

Charles Goodman, 375 Fulton Street, Brooklyn, architect, has plans for one-story automobile service, repair and garage building to cost close to $100,000 with equipment.

Board of Education, White Plains, N. Y., plans installation of manual training equipment in new three-story high school to cost $1,000,000, for which bids are being asked on general contract. Starrett & Van Vleck, 393 Seventh Avenue, New York, are architects.

Trinity Iron Works, Inc., New York, has acquired four four-story buildings, 100 x 100 ft., at 311-17 East Twenty-first Street, and adjoining five-story building, 40 x 98 ft., at 316-18 East Twenty-second Street, for a local plant.

Officials of Staten Island Shipbuilding Co., Port Richmond, S. I., have organized Heat Transfer Products, Inc., to operate as a division of parent company. It is understood that new organization will occupy a section of shipyard for manufacture of special heating equipment. New York offices will be at 90 West Street. George T. Jacocks, formerly vice-president of Whitlock Coil Pipe Co., Hartford, Conn., will be president and general manager; W. S. Ogilvy is vice-president, in charge of production.

Mutual Metal Craft Co., 306 East Fortieth Street, New York, has leased space in building at 388-90 Second Avenue for expansion.

Union School District No. 28, Long Beach, N. Y., is considering installation of manual training equipment in a three-story high and grade school, to cost about $300,000. H. L. Smith, 100 East Forty-second Street, New York, is architect.

Benjamin Driesler, Jr., 153 Remsen Street, Brooklyn, architect, has taken out a permit for a three-story automobile service, repair and garage building, 108 x 200 ft., to cost $350,000 with equipment.

Plans are being arranged by Great Atlantic & Pacific Tea Co., 420 Lexington Avenue, New York, for a new coffee-roasting plant at Toledo, Ohio, with ovens, conveying machinery and other equipment, to cost close to $200,000 with equipment.

The Crane Market

A fair seasonal amount of new business has been placed during the present month and pending, while not all that might be desired, is considered satisfactory. No action has been reported on the considerable amount of prospective export business, but developments on some of these inquiries are expected early in August. Stevens & Wood, Inc., New York, has changed the requirements on a power house crane which will be bought for Deepwater, N. J., and the Reading Iron Co., Reading, Pa., is expecting to purchase a used 7½, 10 or 15-ton electric overhead crane.

Among recent purchases are:

Wilcox & Stultz, Inc., Brooklyn, crawler crane, from Harnischfeger Corporation.

F. G. Schaefer Iron Works, Edgewater, N. J., two 3-ton electric hoists, from Box Crane & Hoist Corporation.

George H. Flinn Corporation, New York, reported to have purchased caterpillar crane from Industrial Brownhoist Corporation.

Gulf Refining Co., New York, one 5-ton, one motor electric overhead crane, with 37-ft. 8-in. span, from Box Crane & Hoist Corporation.

F. L. Smidth & Co., 50 Church Street, New York, engineers, and manufacturers of cement mill machinery, will soon begin work on a one-story foundry addition at Elizabeth, N. J., to cost about $25,000. A crane runway will be installed. John S. Branne, Grand Central Terminal, New York, is consulting engineer.

Borough Council, Fairlawn, N. J., is asking bids until Aug. 14 for equipment for municipal waterworks, including pumping machinery, electrical equipment, elevated tank and tower. McClave & McClave, Cliffside, N. J., are borough engineers. Jasper Van Hook, Jr., is borough clerk.

Humphreys Shipyard Corporation, 347 Madison Avenue, New York, Frederic P. Humphreys, president, has plans for extensions and improvements in its recently acquired plant at Keyport, N. J., to cost close to $50,000 with equipment. Plant will be devoted to production of Diesel engine-driven yachts.

Jersey Central Power & Light Co., 20 South Street, Asbury Park, N. J., has secured a franchise from Township Committee, Montville, N. J., providing for construction of local gas-generating and storage plant.

American Metal Moulding Co., 146 Colt Street, Irvington, N. J., has awarded general contract to Eustice Brothers, Inc., 111 Academy Street, Newark, for a new plant unit, 52 x 200 ft., largely for pipe manufacture, to cost in excess of $50,000.

Pioneer Iron Works, Inc., Newark, Louis J. Siegler, president, has leased about one-half acre at rear of 317-21 Freylinghuysen Avenue, as site for new plant for structural steel and ornamental iron working, for which plans will be drawn soon, to cost close to $45,000 with equipment.

General Tube Co., 49 Empire Street, Newark, manfacturer of metal tubing, etc., is having plans drawn for a one-story addition, to cost about $25,000. Simon Cohen, 130 Branford Place, is architect.

Commissioner of Correction, Department of Correction, 11 North Pearl Street, Albany, N. Y., will receive bids until Aug. 16 for mechanical stokers, feed water heater, etc., for Sing Sing Prison, Ossining, N. Y. Plans and specifications at office of Department af Public Works, Division of Architecture, 353 Broadway, Albany.

M. E. Bernhardt Co., Inc., 127 West Thirtieth Street, New York, has purchased high temperature electric furnace for special operation from Steinmetz Heating Co., Inc., 30 Church Street, New York.

Yale Electric Corporation, Brooklyn, has moved into its new building at 257 Cornelison Avenue, Jersey City.

Philadelphia

PHILADELPHIA, July 23.—Plant and business of Federal Container Co., Fifty-sixth Street and Paschall Avenue, Philadelphia, manufacturer of corrugated paper products, has been acquired by Fiber Board Products, Inc., San Francisco, operated jointly by Zellerbach Corporation and Paraffine Companies, Inc., same city. New owner will operate as subsidiary and use as Eastern branch plant.

West Philadelphia Stock Yards Co., Thirtieth Street, Philadelphia, plans installation of conveying machinery, overhead trolley system, refrigerating equipment and other apparatus in proposed abattoir to cost more than $650,000. J. M. Harlan is president.

Atlantic Gas Co., Lewis Building, Philadelphia, is completing plans for new gas plant at Lexington, N. C., installation to include high pressure tanks, oil tanks, generating sets, purifiers, compression equipment, blowers and accessory equipment. Company also plans to install about 20 miles of steel pipe for distribution.

Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, has acquired through its subsidiary, Transit Land Co., property at Second and Third Streets and Chelten Avenue, totaling 220 building lots, and will use portion of site for new repair and maintenance shops.

Philadelphia Fibre Box Board Mill, Inc., Delaware Avenue and Tasker Street, Philadelphia, has awarded general contract to L. Rosengarten, Otis Building, for three-story and basement addition, 50 x 120 ft., to cost about $35,000.

Edmund H. Poggi, Philadelphia, architect, has plans for a new airport and seaplane port on Pettys Island, for a company now being organized by local interests, to include hangars, repair and reconditioning shops, oil storage and distributing building and other units, to cost in excess of $100,000 with bulkheading of site, etc.

Sunbury Converting Works, Inc., Sunbury, Pa., is having plans drawn for a power house in connection with a new textile mill at Belvidere, N. J., entire project to cost in excess of $90,000, for which bids will be asked on general contract early in August. Company will also build addition to power plant at its Sunbury mill. W. E. S. Dyer, Land Title Building, Philadelphia, is architect and engineer.

Roller Bearing Corporation of America, Inc., is completing removal of its plant from Newark, N. J., to former plant of Mercer Automobile Co., Whitehead Road, Trenton, N. J., where operations will be concentrated in future. It is purposed to increase production at new location.

T. Arthur Karno, Broad Street Bank Building, Trenton, N. J., a member of Karno-Smith Co., Inc., same address, building contractor, has acquired plant of Bordentown Steel & Tube Co., near Bordentown, N. J., at trustee's sale in bankruptcy. New owner plans to continue operations for manufacture of steel tubing and kindred products, and will remodel and improve works. It is understood that new company will be formed to operate mill.

New Jersey Canners' Corporation, care of Edwards & Green, 548 Federal Street, Camden, N. J., architects, plans installation of cold storage and refrigerating plant in new factory at Hammonton, N. J., 100 x 450 ft., to cost more than $100,000.

Pennsylvania Power & Light Co., Allentown, Pa., an interest of Electric Bond & Share Co., 2 Rector Street, New York, has acquired property in vicinity of Frackville, Pa., and is reported planning new steam-operated electric power plant, to cost more than $450,000, to be used largely for service in connection with proposed electrification of Mahanoy Plane division of Reading Railway.

City Council, Bethlehem, Pa., has leased a tract of 78 acres on Hellertown Road, held by Bethlehem Steel Realty Co., as site for new municipal airport, and will develop property at early date, with erection of hangars, repair and reconditioning shops and other structures.

Superior Anthracite Coal Co., Carbondale, Pa., is considering early rebuilding of coal breaker at its local colliery, destroyed by fire July 19, with loss close to $80,000 with equipment.

Board of Trustees, Pennsylvania State College, State College, Pa., has asked bids on general contract for a new engineering building for mechanical and other engineering work, to cost more than $100,000. Charles Z. Klauder, Franklin Bank Building, Philadelphia, Pa., is architect.

Pittsburgh

PITTSBURGH, July 23.—Machine tool business has shown some improvement the past two weeks in sales and inquiries. The Westinghouse Electric & Mfg. Co. has made a few purchases against its third quarter list and is expected to close for several of the important items before the end of the month. Single item orders are fairly numerous. The trade gets its chief encouragement, however, from increased inquiries.

A company is being organized by C. P. Mayer, head of Mayer Aircraft Corporation, Bridgeville, Pa., to establish and operate a local plant for manufacture of cabin-type monoplanes, including parts

and assembling works. Company will also develop a local landing field, with hangars, repair shop, etc.

Board of Education, Apollo, Pa., is said to be planning installation of manual training department in new two-story high school to cost close to $200,000, for which plans are being drawn by A. L. Thayer, Greer Building, New Castle, Pa.

Yelloway Bus Co., Pittsburgh, operating a motor bus system, has leased building of Manchester Auto & Machine Co., 816-26 Manchester Boulevard, for establishment of new service, repair and garage building.

Hammermill Paper Co., Erie, Pa., has plans under way for new mill at Hoquiam, Wash., adjoining plant of Gray's Harbor Pulp Co., now in course of construction at that place. New unit is reported to cost in excess of $400,000.

City Counccil, Follansbee, W. Va., is asking bids until July 31 for a 25-ton incinerator plant.

Board of Trustees, Carnegie Institute of Technology, Pittsburgh, is arranging for establishment of new course in aeronautical engineering beginning with fall term, and will install equipment for instruction, testing, and construction of airplanes, engines, parts and aircraft instruments. Prof. A. H. Blaisdell will be in charge.

Chicago

CHICAGO, July 23.—Sales of machine tools are holding up much better than was expected. Bookings of local machinery houses this month will not be as large as in June, but that month for some sellers was the best in orders entered since 1920. The J. I. Case Threshing Machine Co., Racine, Wis., has placed orders for several special boring and drilling machines, and the John Deere Tractor Co., Waterloo, Iowa, has purchased a number of grinders, special drilling machines and other tools. In recent months there has been a steady stream of machine tool orders from the farm equipment industry, particularly from builders of tractors. It is estimated that the J. I. Case Threshing Machine Co. and the John Deere Tractor Co. have each spent close to $225,000 for machine tools in the past six months.

Demand from miscellaneous sources is still in good volume. Ludlow Typograph Co., Chicago, has bought about $15,000 worth of tools, including two milling machines, a surface grinder, a turret lathe and a drill press. There is little railroad buying, but the Burlington is expected to take early action on a small standing list. Chicago & North Western is inquiring for a motor-driven axle lathe with 25-hp. motor, 440 volts, 60 cycle, 3 phase; also for a motor-driven metal pattern grinding and filing machine with set of tools, No. M. P. 5 Strand or equal, 110 volts, 60 cycle, single phase. There continues to be a fair call for second-hand tools.

Chicago Board of Education will close bids July 26 on a motor-driven No. 3, or equivalent, Ryerson serpentine shear, a 36-in. band saw, a Yates American, or equivalent, 48 x 6-in. grinder and a 12-in. hand jointer with a 7 ft. table.

Contract has been let by Austin Millwork Co., 933 North Cicero Avenue, Chicago, to John Duff, Oak Park, Ill., for one story and basement addition, 125 x 125 ft., to cost close to $50,000 with equipment. George E. Pearson, 4000 West North Avenue, is architect.

Reynold S. Brandt, 6971 Greenview Avenue, Chicago, manufacturer of metal goods, has acquired one story building, 50 x 100 ft., for expansion.

General Electric Co., Schenectady, and 230 South Clark Street, Chicago, is asking bids until July 31 for new factory branch and distributing plant at Pershing Road and Ashland Avenue, Chicago, to cost in excess of $100,000. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, are architects.

Common Council, Atlantic, Iowa, is asking bids until Aug. 1 for one boiler, stoker and auxiliary equipment for municipal power plant. T. E. Nichols is city clerk.

Northwestern Cabinet Co., Burlington, Iowa, is considering rebuilding portion of plant destroyed by fire July 15, with loss estimated at $150,000, including equipment and stock.

Waterworks Department, Waterloo, Iowa, George Shoemaker, general manager, is having plans drawn for one-story and basement equipment storage and distributing plant, with repair facilities, including garage for motor trucks and cars, 75 x 120 ft. John S. Bartley, Pioneer National Bank Building, is architect.

Des Moines Casket Co., 405 Southwest Eighth Street, Des Moines, Iowa, has awarded general contract to Garmer & Stiles, 519 Fourteenth Street, for new one-story plant, 100 x 135 ft., to cost about $40,000 with equipment.

Board of Education, Mattoon, Ill., is considering installation of manual training equipment in new three-story high school to cost $275,000. Berger & Kelley, Lincoln Building, Champaign, Ill., are architects.

Conveying equipment, motors and other mechanical apparatus will be installed in new one-story printing plant, 310 x 500 ft., to be built by Robert O. Law Co., 633 Plymouth Place, Chicago, to cost $400,000. Frank Chase, Inc., 720 North Michigan Boulevard, is engineer.

Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, is said to be planning new two-story branch assembling plant, 115 x 250 ft., at Fargo, N. D., to cost in excess of $125,000 with equipment.

Montana-Dakota Power Co., Marmarth, N. D., is planning one-story addition to local steam-operated electric power plant, including installation of additional equipment, to cost in excess of $45,000.

Northern Pacific Railroad Co., St. Paul, Minn., will erect an addition to its power plant to cost $50,000.

Butler Brothers Mining Co., Nashwauk, Minn., is constructing a machine shop and warehouse, 44 x 100 ft.

New England

BOSTON, July 23.—The city of Boston is reported to have purchased some grinding tools for its Hyde Park district school, and one machine tool house has sold some heavy and expensive tools, details of which are withheld. The new tool market otherwise was dull the past week and comparatively little used equipment was sold. New inquiries have also fallen off.

Unless the city of Boston buys additional equipment for its Hyde Park school within the next few days, July will be a lean month for a majority of machinery houses. Two or three companies, however, will have had the best month this year. The failure of users, particularly in Massachusetts, Connecticut and Rhode Island, to purchase new tools is all the more noteworthy in view that a high level of activity is maintained in metal-working plants, and a real shortage of highly skilled men is reported.

Permission has been granted George B. Torngren, 712 Broadway, Everett, Mass., tinsmith, to erect a new plant. Plans are private.

Edison Electric Illuminating Co., 39 Boylston Street, Boston, has awarded contract for a plant at Canton, Mass. French & Hubbard, 210 South Street, Boston, are engineers.

Henry & Richmond, 112 West Street, Boston, architects, have completed plans for a one-story 60 x 45 ft. power plant, at Massachusetts Normal School, Bridgewater, Mass. J. B. Worcester Co., 72 Milk Street, Boston, is structural engineer.

D. T. Cormier, 15 Herbert Street, Somerville, Mass., architect, is preparing plans for a one-story shop, 40 x 60 ft., to be built by A. Belanger & Son, Dudley Street, Cambridge, Mass., on Brookford Street, that city.

Fred T. Lay Co., Inc., 1215 Main Street, Springfield, Mass., was the bidder on a new pumping station to cost, with equipment, $170,000 in Brightwood district, to be built by city of Springfield. McClintock & Craig, 456 Bridge Street, Springfield, are the architects.

Alden Mfg. Co., Campello, Mass., radio accessories, has merged with Johnson Tool & Molding Co., East Weymouth, Mass. Machinery and business of East Weymouth company will be moved to Campello.

Packard Motor Car Co., East Grand Boulevard, Detroit, has asked bids on general contract for four-story service, repair and sales building on Commonwealth Avenue, Boston, 116 x 230 ft., to cost more than $160,000 with equipment. Albert Kahn, Marquette Building, Detroit, is architect.

Frolland Chain & Mfg. Co., Albany Street, Springfield, Mass., Paul Frolland, head, has filed plans for one-story plant unit, to cost about $25,000 with equipment.

Burns Brothers, Inc., 260 Huyshope Avenue, Hartford, Conn., has taken out a permit for new one-story central repair and machine shop at its new coal and coke distributing plant in Parkville district, to cost approximately $25,000 with tools.

New England Transportation Co., Fall River, Mass., is considering plans for new motor bus terminal with garage, service and repair facilities, to cost close to $200,000 with equipment.

Metal Craftsmen, Inc., 141 Georgia Avenue, Manucentre district, Providence, R. I., manufacturer of window ventilators, etc., has work under way on one-story, L-shaped addition, 50 x 125 ft., to cost more than $40,000.

American Writing Paper Co., Main Street, Holyoke, Mass., has awarded general contract to Casper Ranger Construction Co., 20 Bond Street, for three-story addition, and one-story boiler plant, to cost about $60,000 with equipment.

Charles Street Garage Co., Boston, has awarded general contract to Aberthaw Co., 80 Federal Street, for two-story service, repair, and garage building, 85 x 130 ft., to cost approximately $100,000 with equipment.

Saco-Lowell Shops, Lowell, Mass., manufacturer of textile machinery and parts, is arranging for early removal of final

operating unit of local plant to Newton Upper Falls, Mass., where production will be concentrated. Lowell shop will be placed on market.

Blanchard Mfg. & Canning Co., Eastport, Me., is said to have plans for new factory unit to cost about $50,000. It will replace a portion of plant recently destroyed by fire.

Cavanagh Engineering Co., 131 Washington Street, Providence, R. I., has been formed to manufacture automobile accessories and devices. Company has placed Solite trouble lamp on market and is having parts made to specifications and doing its own assembly work. Metal stampings, fiber parts, screw machine products, miniature automobile lamps and wire are being purchased.

Contract for construction of power plant for Underwood, Elliott-Fisher Co., Hartford, Conn., has been let to Aberthaw Co., Boston.

Cleveland

CLEVELAND, July 24.—Machine tool sales were fairly good the past week and the July volume promises to show a gain over June. The majority of orders during the week were for single machines. The General Electric Co. is buying considerable press equipment for its Erie, Pa., works, for making electric refrigerators. It has purchased about 20 large presses and has another inquiry out for five large machines. This company is also buying complete die equipment for its presses. It is stated that its purchase of press equipment and machines now pending will aggregate $225,000.

Byers Machine Co., Ravenna, Ohio, during the week purchased a 48-in. open-side planer and is inquiring for a horizontal boring machine. A Warren, Ohio, manufacturer also bought a planer of same type. Single tool orders for turret lathes continue good. Board of Education, Toledo, Ohio, is inquiring for eight or 10 metal-working machines, including lathes, grinders and one milling machine. Press manufacturers report a better volume of sales in this territory this month than in June and a 25 per cent gain over July last year. Automobile parts manufacturers are buying some machinery, but little business is coming at present from automobile manufacturers in the Michigan territory.

Plans are being arranged by Cleveland Electric Illuminating Co., Illuminating Building, Cleveland, for two-story power substation, to cost approximately $100,000 with equipment.

Snappy Radiator & Battery Service Co., 736 Cleveland Avenue, S. W., Canton, Ohio, has asked bids on general contract for one-story addition, to cost about $42,000 with equipment.

Diller Mfg. Co., Bluffton, Ohio, manufacturer of electrical products and radio equipment, has plans for new one-story plant, 85 x 118 ft., to cost about $45,000 with equipment.

City Council, Canton, Ohio, has approved fund of $100,000 for purchase of property for a municipal airport and erection of hangars, repair and reconditioning shops, oil storage and distributing building, and other mechanical units.

G. & C. Foundry Co., West Monroe Street, Sandusky, Ohio, manufacturer of rough gray iron castings, has plans for a one-story addition, 30 x 280 ft., and will soon begin superstructure.

Board of Education, Akron, Ohio, plans installation of manual training equipment in new two-story and basement high school to cost about $250,000, for which superstructure will soon begin.

Hocking Valley Railroad Co., Marion, Ohio, plans extensions in local water system to cost about $250,000, including installation of pumping machinery and auxiliary power equipment, and water-softening equipment.

Superior Screw & Bolt Co., 3650 East Ninety-third Street, Cleveland, has filed plans for one-story machine shop, 100 x 150 ft., to cost close to $70,000 with equipment.

Cleveland Railway Harbor Co., Williamson Building, Cleveland, will install elevating, conveying and other handling equipment, factory trucks and tractors, etc., in proposed eight-story warehouse and terminal building, to cost in excess of $10,000,000. Moores & Dunford, Inc., 110 West Forty-second Street, New York, is engineer.

Buffalo

BUFFALO, July 23. — Arrangements have been made by Arcadia Truck Body Corporation, Newark, N. Y., for purchase of plant and business of H. H. Babcock Equipment Corporation, Watertown, N. Y., manufacturer of automobile bodies, and will consolidate with its organization. It is understood that new owner will discontinue operations at Watertown, and will remove equipment and concentrate production at Newark.

George W. Holt, 1374 Delaware Avenue, Buffalo, and associates have organized European Art Metal Corporation, with capital of $25,000, and plans early operation of plant for manufacture of ornamental metal products. E. W. Holt, 70 Barkley Place, is also interested in new company.

Union Carbide & Carbon Corporation, 30 East Forty-second Street, New York, has purchased controlling interest in Acheson Graphite Corporation, with plant at Niagara Falls, N. Y., for manufacture of graphite in powdered and electrode form. New owner will operate Acheson plant as a division.

Board of Education, Syracuse, N. Y., is said to be planning installation of manual training equipment at central high school, in connection with new three-story addition and improvements in present building to cost about $400,000. Bids will be asked in about 30 days. A. L. Brockway, Third National Bank Building, is architect.

General Gas Furnace Co., Inc., Rochester, N. Y., care of Frederick W. Armbruster, Sr., 4476 St. Paul Boulevard, recently formed by Mr. Armbruster and associates, plans operation of local plant for manufacture of gas-fired furnaces, parts, and other heating equipment. Lewis S. Edgarton, 84 Briarcliffe Road, Irondequoit, N. Y., is also interested in new company.

Oswego Falls Corporation, Fulton, N. Y., operating pulp and paper mills, has awarded general contract to Austin Co., for a two-story addition to cost close to $100,000 with equipment.

Indiana

INDIANAPOLIS, July 23.—Plans have been approved by Southern Indiana Gas & Electric Co., Evansville, for new steam-operated electric power plant to cost in excess of $1,250,000 with equipment. Extensions will also be made in transmission lines.

Board of Education, Columbus, is said to be planning installation of manual training equipment in two-story addition to junior high school to cost about $100,000, for which bids will soon be asked on general contract. Norman H. Hill, Jr., 1050 North Delaware Avenue, Indianapolis, is architect.

Leneham & Dunphy, Vincennes, architects, have asked bids on general contract for automobile service, repair and garage building, to cost close to $100,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in four-story and basement warehouse to be built by Kroger Grocery & Baking Co., 815 Main Street, Cincinnati, at Indianapolis, to cost in excess of $750,000. Emil H. Nieman, 3816 Shaw Avenue, St. Louis, is architect. A refrigerating and cold storage plant will be installed in separate unit; and automobile repair shop and garage built on adjoining site.

City Council, Muncie, is planning establishment of municipal airport and is arranging appropriation of $75,000, to include hangars, repair and reconditioning shops, oil storage and distributing building.

Board of Public Works, Evansville, has plans under way for establishment of municipal airport, for which fund of about $100,000 has been arranged, including hangars, repair shops, oil storage and distributing building and other units. B. Russell Shaw, Inc., 810 Olive Street, St. Louis, is architect.

Board of School Commissioners, 150 North Meridian Street, Indianapolis, has awarded general contract to W. P. Jungclaus, 825 Massachusetts Avenue, for Arsenal technical high school, with manual training department, to cost about $200,000.

Bedford Foundry & Machine Co., Bedford, has completed a plant addition, 135 x 300 ft.

Property of Brazil Machine & Foundry Co., Brazil, will be offered at public auction soon at a receiver's sale.

Chamber of Commerce, Plymouth, Ind., is promoting the sale of $30,000 worth of stock in Plymouth Body Works to finance an increase in its capacity. The company builds school hacks.

St. Louis

ST. LOUIS, July 23.—Bids have been asked on general contract by Central Hardware Co., 811 North Sixth Street, St. Louis, for two-story and basement storage and distributing plant, 90 x 195 ft., to cost about $100,000 with equipment. Leo F. Abrams, Chemical Building, is architect.

Conveying machinery, refrigerating, and other equipment will be installed in new one-story meat-packing plant to be erected by Fred Dold Packing Co., 426 North Belmont Street, Wichita, Kan., to cost $145,000 for which bids will be asked on general contract early in August. Henschien & McLaren, 1637 Prairie Avenue, Chicago, are architects and engineers.

Corn Products Refining Co., Kansas City, Mo., has filed plans for one-story addition at North Kansas City, to cost close to $140,000. Headquarters are at 17 Battery Place, New York.

Board of Managers, Missouri School for Deaf, Fulton, Mo., has taken bids on revised plans for two-story manual training building, 51 x 101 ft., to cost more than $45,000 with equipment. C. A. Smith,

Finance Building, Kansas City, Mo., is architect.

Kansas City Power & Light Co., Fourteenth Street and Grand Avenue, Kansas City, Mo., will take bids about middle of August for four-story automobile service, repair and garage building, 125 x 140 ft., with foundations for six additional stories later, to cost close to $200,000. H. G. Freshman is company architect.

Red Bird Aircraft Corporation, 1513 North Fonshill Street, Oklahoma City, Okla., E. S. Keller, president, has taken over building formerly used for motor truck manufacture, and will remodel for new airplane works, with parts and assembling departments. Present factory at Bern, Kan., will be removed to new location.

Board of Public Service, City Hall, St. Louis, is said to be arranging fund of $2,000,000 for establishment of municipal airport, and purposes to take over Lambert-St. Louis flying filed at Bridgeton, Mo., and build hangars, repair shops and other units. B. Russell Shaw Co., 4616 Lindell Boulevard, is consulting engineer for project.

International Harvester Co., 606 South Michigan Avenue, Chicago, and 316 North Santa Fe Street, Salina, Kan., has awarded general contract to Fred Hartley, 121 North Second Street, Salina, for three-story factory branch and distributing plant, 50 x 120 ft., at Salina, to cost upward of $85,000 with equipment.

City Council, Kansas City, Mo., has called special election on Aug. 7 to approve bonds for $1,000,000 for a municipal airport, including land purchase and erection of hangars, repair and reconditioning units, and other buildings; also bonds for $3,000,000 for extensions and improvements in municipal waterworks, including installation of pumping machinery and other power equipment.

Missouri-Kansas Zinc Co., 74 Trinity Place, New York, is planning extensions and improvements in plant of Kansas Zinc Mills Corporation in Missouri, including addition to flotation mill, conveying and transportation facilities, etc., to cost more than $100,000.

Board of Education, Kearney, Neb., plans extensions and betterments in one-story manual training building to cost about $35,000. H. M. McClure, Kearney, is architect.

Quick Motors Corporation, Union National Bank Building, Wichita, Kan., has plans for one-story plant, 50 x 150 ft., to cost about $35,000 with equipment.

Reed & Duecker, Inc., 171 North Main Street, Memphis, Tenn., has been appointed representative in that territory for National Flue Cleaner Co., Groveville, N. J.

Detroit

DETROIT, July 23.—Contract has been let by Keeler Brass Co., Grand Rapids, Mich., to Owen-Ames-Kimball Co., Grand Rapids, for one-story addition, to cost close to $40,000 with equipment.

Washtenaw County Board of Education, Ypsilanti, Mich., is planning construction of one-story mechanical arts and manual training building at school at South Ypsilanti, to cost in excess of $100,000 with equipment.

Bohn Aluminum & Brass Corporation, 2512 East Grand Boulevard, Detroit, is arranging for bond issue of $2,155,700, proceeds to be used primarily for purchase of plant and business of Michigan Smelting & Refining Co., 7885 Joseph Campeau Avenue, and for expansion.

City Council, Pontiac, Mich., has authorized fund of $180,000 for construction of municipal airport, including hangars, repair and reconditioning shops, oil storage and distributing building and other units.

Federal Screw Works, Inc., 3401 Martin Avenue, Detroit, has awarded general contract to Hazelton & Clark, Michigan Theater Building, for one-story addition, 95 x 120 ft., to cost close to $60,000 with equipment.

Consumers Power Co., Jackson, Mich., is arranging for increase in capital from $75,000,000 to $100,000,000, a portion of proceeds to be used for extensions and improvements in plants and system, including new hydroelectric generating plant units, transmission lines and power substations.

Evans Auto Loading Co., Dime Bank Building, Detroit, is arranging for increase in capital from $700,000 to $1,000,000, a portion of proceeds to be used for expansion, including new Pacific Coast branch at Eureka, Cal., for production of battery separators and kindred products. Company also specializes in manufacture of automobile loading equipment and devices.

Milwaukee

MILWAUKEE, July 23. — Continued improvement is noticeable, both in current machine tool business and prospects for the remainder of the year, especially with respect to local industries. It has been a long time since new projects in the foundry and machine shop group have been so numerous or of such proportions as those that have developed in the last two to three weeks. Inquiry for tools of all kinds is active and some shops are working overtime to make prompt deliveries.

One of the largest industrial construction undertakings in Milwaukee in more than a year is the erection of a $500,000 addition, 280 x 720 ft., to works of A. O. Smith Corporation for fabrication of electrically welded pipe for lines in Southwestern oil fields. E. W. Burgess is construction engineer.

Kearney & Trecker Corporation, 5924 National Avenue, Milwaukee, manufacturer of milling machines, will again enlarge its capacity and has placed general contract with Joseph Sausen, 352 Greenfield Avenue, Wauwatosa, for a two-story addition, 72 x 75 ft. Plans are by Kirchhoff & Rose, architects, 196 West Water Street.

Austin Co., Cleveland, has general contract for a one-story manufacturing and storage building, 190 x 405 ft., for Geuder, Paeschke & Frey Co., 38 Fifteenth Street, Milwaukee, manufacturer of metal stampings, enameled ware, etc. Cost is estimated at $100,000.

Chain Belt Co., 736 Park Street, Milwaukee, has placed general contract with Klug & Smith Co., consulting engineer, 69 East Wisconsin Avenue, for a manufacturing building, 104 x 150 ft., at its Orchard Street works, to be ready Sept. 15.

Waukesha Motor Co., Waukesha, Wis., which recently decided upon a $600,000 works extension program, has engaged Wisconsin Bridge & Iron Co., Milwaukee, to design and erect first unit, 176 x 308 ft., to cost $100,000. Equipment purchases are now being made. Harry L. Horning is president and chief engineer.

Van Brunt Mfg. Co., Horicon, Wis., division of Deere & Co., Moline, Ill., and manufacturing grain drills and seeding machines, is preparing for plant extensions costing about $200,000. Contracts will be placed through general offices at Moline for a forge shop, 145 x 180 ft.; three-story warehouse, 96 x 125 ft., and three-story addition for elevator shaft, 20 x 40 ft. Plans are by O. A. Eckerman, company engineer, Moline.

MacWhyte Co., 2906 Fourteenth Avenue, Kenosha, Wis., manufacturer of wire rope, cable, etc., is erecting an addition to its plant. George S. Whyte is president and general manager.

Spring City Foundry Co., 901 West St. Paul Avenue, Waukesha, Wis., manufacturer of gray iron castings, has work under way on a shop addition costing about $25,000.

Kohn Mfg. Co., 1375 Thirtieth Street, Milwaukee, manufacturer of domestic garbage incinerators, is awarding contracts for a one-story addition, 59 x 105 ft.

Richland Center, Wis., is asking bids until Aug. 7 for one high-pressure steam turbine generator unit with auxiliaries, including one cooling tower, for city water and light plant. Guy C. Luckey is city clerk.

Gugler Lithographic Co., 687 Milwaukee Street, Milwaukee, is asking bids for erection of six additional stories on its two-story manufacturing building, 60 x 128 ft.

Cincinnati

CINCINNATI, July 23.—While the machine tool market is devoid of feature, current business placed with local builders has fallen only a little short of that in June. Almost without exception, orders have been for one or two tools and have come from all parts of the country. Fresh inquiries have been fairly good and indicate that any serious diminution in buying is not likely in the near future. Manufacturers naturally anticipate a temporary lull in sales during the next 30 to 60 days on account of the vacation season, but the decline in business is expected to be less than usual.

The New York Central is reported to have bought three or four engine lathes, and several carriers in the Chicago district are considering the purchase of single machines. The Jackson Steel Products Corporation, Jackson, Mich., has closed for a 5-ft. Right Line radial drill.

General contract has been let by Steel Products Engineering Co., Springfield, Ohio, to Knowlton-Wortman Co., local, for one-story addition, 90 x 195 ft., to cost close to $70,000 with equipment. Lloyd Zeller, Springfield, is architect.

Bids will be asked about middle of August by Franciscan Fathers of Cincinnati, care of J. F. Sheblessy, Twelfth and Republic Streets, Cincinnati, architect for three-story Roger Bacon High School for Boys, with manual training facilities, to cost about $750,000.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until Aug. 2 for 599 propellers, circular 43; until July 30 for 588 wheel assemblies, 800 hub bushings and 1624 streamlines, circular 42.

Carnation Milk Products Co., Oconomowoc, Wis., is said to be planning construction of can-manufacturing unit in connection with proposed milk condensary at Maysville, Ky. A power house and machine shop are planned also. Entire project is reported to cost close to $500,000.

United States Engineer Office, Louis-

ville, will receive bids until Aug. 9 for machinery for power house at lock and dam No. 51, Ohio River, including pumping equipment and gate and valve-operating machinery.

Sevierville Power & Light Co., Sevierville, Tenn., has plans for addition to electric light and power house, including installation of additional equipment. L. M. Dow is engineer.

Board of Education, Hamilton, Ohio, plans installation of manual training equipment in new two-story junior high school to cost $500,000, for which bids will soon be asked on general contract. F. J. Mueller, Rentschler Building, is architect.

Eastbourne Garage Co., Cincinnati, has awarded general contract to Ferro Concrete Construction Co., Cincinnati, for four-story service, repair and garage building to cost in excess of $500,000. Harry Hake, Telephone Building, is architect.

Safety Automatic Gate Co., box 382, Ashland, Ky., has been incorporated to manufacture patented safety automatic gate for railroad crossings. Company expects to locate plants at Ashland and Chicago.

South Atlantic

BALTIMORE, July 23.—Plans are being arranged by Burns Bottling Machine Works, Inc., 2329 Kirk Avenue, Baltimore, for extensions and installation of new equipment; an electric trolley hoist about 2000-lb. capacity, with accessory apparatus will be purchased.

Davison Chemical Co., Garrett Building, Baltimore, manufacturer of fertilizer products, etc., has plans for addition to plant in Curtis Bay section, to cost more than $375,000 with machinery. A. Benson is company engineer.

William H. Swartz, 205 West Camden Street, Baltimore, vice-president, Columbia Wholesale Aircraft Corporation, is at head of new company being organized to establish a plant for production of small commercial airplanes to sell at popular price. Factory property will be secured at once and equipment installed. Allen Davis, Baltimore, will also be connected with new company, as well as Harvey W. Doyle, formerly with Detroit Aircraft Corporation, Detroit.

Board of Aldermen, Rocky Mount, N. C., will receive bids until July 31 for equipment for municipal power plant, including one 5000-kw. turbo-generator, with direct-connected exciter; one turbo-generator air cooler; one surface condenser for turbo-generator, complete with motor-driven condensing water circulating pump; dry vacuum pumps; motor-driven hot well pump; steam turbine-driven hot well pump; automatic atmospheric exhaust relief valve and accessory equipment. William C. Olsen, Inc., Raleigh, N. C., is engineer.

United States Leather Co., 17 Battery Place, New York, is reported planning one-story paper mill unit, 100 x 400 ft., in conjunction with tannery at Big Stone Gap, Va., for production of coarse paper pulp materials as used in leather industry. It is estimated to cost more than $350,000 with machinery.

In connection with expansion and improvement program to cost $21,144,724, authorized by Chesapeake & Ohio Railroad Co., Richmond, Va., it is planned to make additions in present locomotive and car repair shops, and to build new units of this kind to cost more than $1,000,000 of sum noted.

Roanoke River Power Co., Richmond, Va., is planning early construction of hydroelectric power plant on Roanoke River, near Bugg's Island, vicinity of Weldon, N. C., with initial capacity of 80,000 hp., estimated to cost more than $5,000,000 with power dam and steel tower transmission system.

General purchasing officer, Panama Canal, Washington, is asking bids until Aug. 13 for drilling machines, concrete mixers, wire cloth, wire lath, cable, insulated wire, soldering irons, copper rail conductor, and other mechanical equipment, Panama circular No. 1891.

Albany Crystal Ice Co., Albany, Ga., has approved construction of new ice-manufacturing plant to cost about $50,000.

Hiner Supply Co., Raleigh, N. C., is rebuilding machine shop and foundry recently destroyed by fire, to cost close to $40,000 with equipment.

Eastern Silica & Chemical Corporation, care of John F. Penrose, Winchester, Va., president, recently formed by Mr. Penrose and associates, plans development of glass sand deposits in western part of Winchester County, where tract of more than 150 acres has been acquired, including installation of mining machinery, mill, power equipment, etc., to cost more than $45,000.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids (no closing date stated) for power plant equipment for naval station at Quantico, Va., including watertube boiler, coal pulverizers, burners, turbine and motor-driven forced-draft fans, feed water heater, storage tanks; boiler feed, vacuum and condensate pumps, electric pyrometer; equipment for conveying and storing coal and ashes; refrigerating and ice-making machinery; switchboard and accessory equipment, specification 5602.

American Peanut Corporation, Norfolk, Va., plans installation of two 100-hp. oil engine units, with auxiliary equipment, for power service at mill, and will soon make purchase.

Virginia-Carolina Power Co., Mutual Building, Richmond, Va., is said to be planning new hydroelectric generating plant on Roanoke River, with initial capacity of 50,000 hp., to cost more than $3,500,000 with transmission system.

A. S. Furtwangler, 4 South Broad Street, Charleston, S. C., has been appointed representative for National Flue Cleaner Co., Inc., Groveville, N. J.

Gulf States

BIRMINGHAM, July 23.—Plans are being considered by Fort Worth & Denver City Railway, Fort Worth, Tex., for a new coach shop at Childress, Tex., for car repair and construction work, to cost about $150,000.

J. S. Cosden & Co., Tulsa, Okla., have approved plans for a new oil refinery at Big Springs, Tex., with capacity of 10,000 bbl. per day in skimming and cracking units, to cost more than $850,000 with machinery. Company will also build 12-mile pipe line from oil wells to refinery.

Parkersburg Rig & Steel Co., Parkersburg, W. Va., manufacturer of oil well equipment, plans new branch plant in Esperson industrial tract, Houston, Tex., to cost close to $23,000.

Crane Co., 836 South Michigan Avenue, Chicago, has filed plans for one-story and basement factory branch and distributing plant at Dallas, Tex., to cost $70,000 with equipment.

Abilene Cottonseed Oil Co., Abilene, Tex., has plans for a new one-story cottonseed oil mill, 90 x 350 ft., to cost about $75,000 with equipment, and will soon begin superstructure.

Anticich Packing Co., Biloxi, Miss., has approved plans for one-story ice-manufacturing plant, 45 x 100 ft, to cost $70,000.

Yount-Lee Co., Beaumont, Tex., has awarded general contract to Reeves Brothers, Birmingham, for addition to oil storage and distributing plant at Spindleton, to cost more than $500,000 with equipment.

Following recent acquisition of mill of L. H. Gilmer Co., Inc., Shreveport, La., manufacturer of belting, etc., by new interests, headed by Chester Tharp, George Beveridge, and associates, plans are being arranged for extensions and improvements, including installation of new machinery.

Beebe Ice Co., South Grandview Avenue, Daytona Beach, Fla., is planning construction of new ice-manufacturing plant at Pensacola, Fla., to cost about $75,000.

E. A. George, 1146 Kings Highway, Shreveport, La., architect, has filed plans for a three-story automobile service, repair and garage building, to cost about $130,000.

Rome Electric Range Co., Huntsville, Ala., will proceed with erection of new one-story plant, 50 x 165 ft., and will soon purchase equipment, including battery of small presses and other tools.

C. M. Ayres, Tuscaloosa, Ala., architect, will soon begin work on two-story and basement automobile service, repair and garage building, 110 x 132 ft., to cost close to $85,000 with equipment.

A. & K. Auto Top & Paint Co., Dallas, Tex., manufacturer of automobile tops, frames, etc., plans rebuilding portion of plant recently destroyed by fire, with loss reported at $50,000 including equipment.

Board of Education, Montgomery, Ala., will build one-story vocational shop at new Lanier High School, for which appropriation of $1,000,000 has been made. Bids on general contract are being asked until July 31. Frederick Ausfeld, Shepherd Building, is architect.

Fuel Efficiency Engineering Co., American Trust Building, Birmingham; Buckmaster-Luck-Malochee, Inc., Industrial Homestead Building, New Orleans, and Henry Eggelhof, Construction Industries Building, Dallas, Tex., have been appointed representatives in their various districts for National Flue Cleaner Co., Inc., Groveville, N. J.

Pacific Coast

SAN FRANCISCO, July 18.—Plans are under way by Pacific Coast Pulp & Paper Co., Los Angeles, care of D. M. Thomas, Santa Monica, Cal., recently formed by Mr. Thomas and associates with capital of $1,500,000, for new mill at Richvale, Cal., for production of paper from rice straw, consisting of main unit, 66 x 225 ft., and four smaller buildings, with power house, 50 x 80 ft., to cost in excess of $400,000, with machinery. Wesley S. Martin, Los Angeles, is secretary and treasurer, and Mr. Thomas, president. C. A. Kieren is superintendent and engineer.

Board of Education, Burbank, Cal., has awarded general contract to A. D. Paschall, 1661 Forest Street, Pasadena, Cal., for new junior high school with manual training unit, to cost about $200,000, to be known as New Valley Junior

High School. Francis H. Rutherford, Mills-Fraser Building, Santa Monica., Cal., is architect.

Victor Talking Machine Co., Camden, N. J., has engaged William A. Knowles, 1214 Webster Street, Oakland, Cal., architect, to prepare plans for its plant at Hollywood, Los Angeles, for development and manufacture of equipment for talking motion pictures. Initial unit will approximate 30,000 sq. ft. of floor space and will cost in excess of $200,000 with equipment.

Marconi Mfg. Co., Seattle, manufacturer of radio equipment and devices, has awarded general contract to Hoard Engineering Co., Pantages Building, for new plant, to cost approximately $55,000 with equipment. Hancock & Lockman, Walker Building, are architects.

Conveying machinery, loading equipment, motors and other power equipment, will be installed in new packing plant to be constructed by Irvine Valencia Growers Association, Tustin, Cal., to cost about $85,000.

Yellow Cab Co., 1290 Bush Street, San Francisco, has awarded general contract to Cahill Brothers, Inc., 206 Sansome Street, for three-story service, repair and garage building to cost $350,000 with equipment. Powers & Ahnden, 605 Market Street, are architects.

Fir-Tex Insulating Board Co., Portland, care of H. M. McCormick, Portland, president, is considering plans for new insulating board mill in St. Helens, Ore., district, using sawmill waste as raw material. It will include power house, machine shop and other buildings, to cost more than $1,000,000 with machinery. A. E. Millington, Portland, is vice-president and general manager.

Edwards Mfg. Co., Spokane, Wash., and Cincinnati, manufacturer of sheet metal specialties, has awarded general contract to P. J. Young, West Cleveland Street, Spokane, for one-story plant to cost about $45,000 with equipment.

W. S. Ray Mfg. Co., Milton and Bosworth Streets, San Francisco, manufacturer of ranges, oil burners and kindred heating equipment, is having plans drawn for one and two-story addition, to cost about $75,000 with equipment. Irvine & Ebbets, Call Building, are architects.

Alameda Airport, Inc., 550 Howard Street, San Francisco, is having plans drawn for a new airport at Alameda, Cal., comprising nine hangars, repair and reconditioning shops and other units, to cost more than $65,000. E. G. Burr, address noted, is engineer.

H. D. Carter and Robert C. Oliphant have formed Carter Specialties Co., with headquarters in Hobart Building, San Francisco. It has recently been appointed northern California distributer for Leadclad products manufactured by Wheeling Metal & Mfg. Co., Wheeling, W. Va. A stock of flat and corrugated sheets is being carried by the company.

Plant and property of the Republic Steel Co., 733 Brannan Street, San Francisco, has been purchased by George R. Borrmann Steel Co., Oakland, which will continue operations under latter name. Approximately 1200 tons of material has been taken over and the company is now one of the largest distributers of steel products on the Pacific Coast.

St. Helens Iron & Marine Works, St. Helens, Ore., has been sold to H. W. Clark, Kelso, Wash. New company will be known as St. Helens Welding & Machine Works, and will be operated by Mr. Clark, who also owns Clark Welding Works, Kelso and Longview.

Canada

TORONTO, July 23.—In addition to a steady flow of single tool orders, several orders were closed the past week for lists of from six to a dozen tools, and inquiries are out for other lists which will be placed before the end of the month. Business so far this month shows general improvement over that in July last year.

General Motor Corporation of Canada will shortly be in the market for tools and equipment for its new western Canada plant under construction. Purchases are being made for Point St. Charles shops of Canadian National Railways. Link-Belt, Ltd., Toronto, is preparing lists for equipment for a proposed machine shop. Canadian General Electric Co. has still to purchase tools, etc., for an addition to its Peterborough, Ont., plant now under construction. Public Utilities Committee, Winnipeg, will soon call for bids for power development machinery.

International Nickel Co., Sudbury, Ont., has started excavation work for a new smelter, construction to be started in about a month or six weeks. It will have a capacity of 3000 tons daily. A concentrator mill will also be erected.

Township Council, Scarboro, Ont., has purchased site on Massey Creek for a sewage disposal plant. Bids for equipment and construction are being received by W. D. Annis, town clerk, 1683 Kingston Road, Toronto.

Canadian Paper Board Co., Commissioner Street, Toronto, has taken out a permit for erection of a power plant to cost $70,000.

In connection with a one-story plant, 100 x 400 ft., for Service Station Equipment Co., Ltd., 510 King Street East, Toronto, separate tenders are being received by D. Brouse, architect, care of company, for construction work, excavation, masonry, structural steel, steel sash, sheet metal, etc.

General Motors of Canada, Ltd., Oshawa, Ont., is having plans prepared by Hutton & Souter, 6 James Street, Hamilton, for an assembly building and power plant in connection with its plant at Walkerville, Ont.

Galt Art Metal Co., 385 Dundas Street, Galt, Ont., has awarded contract to A. Schnarr, 48 William Street, Waterloo, Ont., for a one story addition, 50 x 125 ft., mill and brick construction. B. A. Jones, 14 Ontario Street, Kitchener, Ont., is architect.

Western Canada

Harold A. Brown, secretary-treasurer, of town of Drumheller, Alta., will receive bids until Aug. 6, for one 1000 Imperial gal. per min. centrifugal pump and motor and other equipment for waterworks plant.

Foreign

PLANS are being arranged by El Aguila Petroleum Co., Minatitlan, Mexico, for extensions and improvements in oil refinery to double approximately present capacity, to cost more than $2,500,000 with equipment. Company also purposes to build a new pipe line from recently established oil wells on Isthmus of Tehuantepec to refinery.

Department of Public Works, Government of Austria, Vienna, is considering construction of hydroelectric power plants on Danube River, and three sites for such number of individual plants are under advisement. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Austria No. 281897.

Marioupol Iron Works, Marioupol, Russia, understood to be an interest of Soviet Russian Government, Petrograd, has plans for new plant for production of iron pipe, for oil field and other service. Initial project is estimated to cost $4,000,000, and ultimate works about three times that sum. American Russian Chamber of Commerce, 145 West Fifty-seventh Street, New York, has information of project.

Department of Public Works, State of Sao Paulo, Sao Paulo, Brazil, is arranging for early sale of bonds in United States, totaling about $15,000,000, proceeds to be used for extensions and improvements in water system of City of Sao Paulo, including installation of pumping machinery and other power equipment, pipe lines, etc., and for extension of Sorocabana Railway to Port of Santos, with terminal and shop facilities.

Government of Netherlands, Rotterdam, is considering establishment of new plant near State mine Maurits, Lutterdau, Province of Limburg, for manufacture of synthetic ammonia. Initial project is estimated to cost $5,037,000 with machinery. Netherlands Parliament has authorized initial appropriation of $1,007,000 for work, and additional funds will be voted later. Information at office of American Consulate, Rotterdam, Eugene W. Nabel, vice-consul.

Ulen & Co., 120 Broadway, New York, contractors, affiliated with a group of international contractors at London, England, and other points, have secured a contract from Persian Government, Teheran, for construction of railroad from Khor Musa, on Persian Gulf, to point on Caspian Sea, about 1000 miles, to cost $125,000,000 with rolling stock, repair and construction shops, division yards, etc. Contract calls for completion of first 100 miles within 18 months. Road will pass through Teheran and Hamadan.

New Trade Publications

Carbic Lights and Carbic Generator.—Oxweld Acetylene Co., 30 East Forty-second Street, New York. Booklets, 3½ x 6¼ in., describing the use of cylindrical cakes of compressed calcium carbide in special portable generators for producing acetylene at low pressure for cutting and welding operations, and the various styles of burners and reflectors suitable for flood-lighting construction work.

Truck-Type Tractor.—Monarch Tractors Corporation, Springfield, Ill. Folder of eight pages devoted to a tractor capable of producing 78 drawbar hp. and weighing 22,500 lb. Illustrations show the equipment in use.

Jig Boring Machines.—R. Y. Ferner Co., Washington. Novel 11-page booklet bearing the title "Questions to Ask Before Buying a Jig Boring Machine." Features of the jig borers of the Societe Genevoise d'Instruments de Physique, Geneva, Switzerland, of which the Ferner company is representative, are dealt with in answer to some 80 questions in the booklet.

Pure Iron Plates.—American Rolling Mill Co., Middletown, Ohio. Twenty-page pamphlet, 8⅜ x 11 in., describes the pure iron plates which the company rolls for water supply and other engineering projects in which resistance to corrosion is a main consideration. Illustrations show Armco plates used for fusion welding, for stacks and breeching, gas coolers, standpipes, tanks and other long service work.